Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

VOL. VIII.—NO. 5. (NEW SERIES.) | NEW YORK, JANUARY 31, 1863. | SINGLE COPIES SIX CENTS. $3 PER ANNUM—IN ADVANCE.

Improved Rotary Engine.

The annexed engraving is an illustration of Root's rotary engine, which, from what we have seen of it, seems destined to occupy a place among the useful inventions of the day. A rotary engine which would possess durability and economy equal to the reciprocating engine now in common use, is a thing which has been much sought after heretofore, but not, however, with much success. The advantages of an engine of this kind, if so perfected and introduced into use, would be very great, and this is acknowledged, so far as we know, by all who are conversant with the subject. Among the advantages are great diminution of cost, saving of room and weight, &c. The above engine has been in use at different places in the city for over a year past, and we are told that the results obtained in regard to durability and economy are truly remarkable in an invention of this kind. The invention is covered by several patents which are in the hands of a company, who have established a factory at No. 9 Adams street, Brooklyn, N. Y., and they are turning out about one 15-horse engine per week; other sizes will soon be completed.

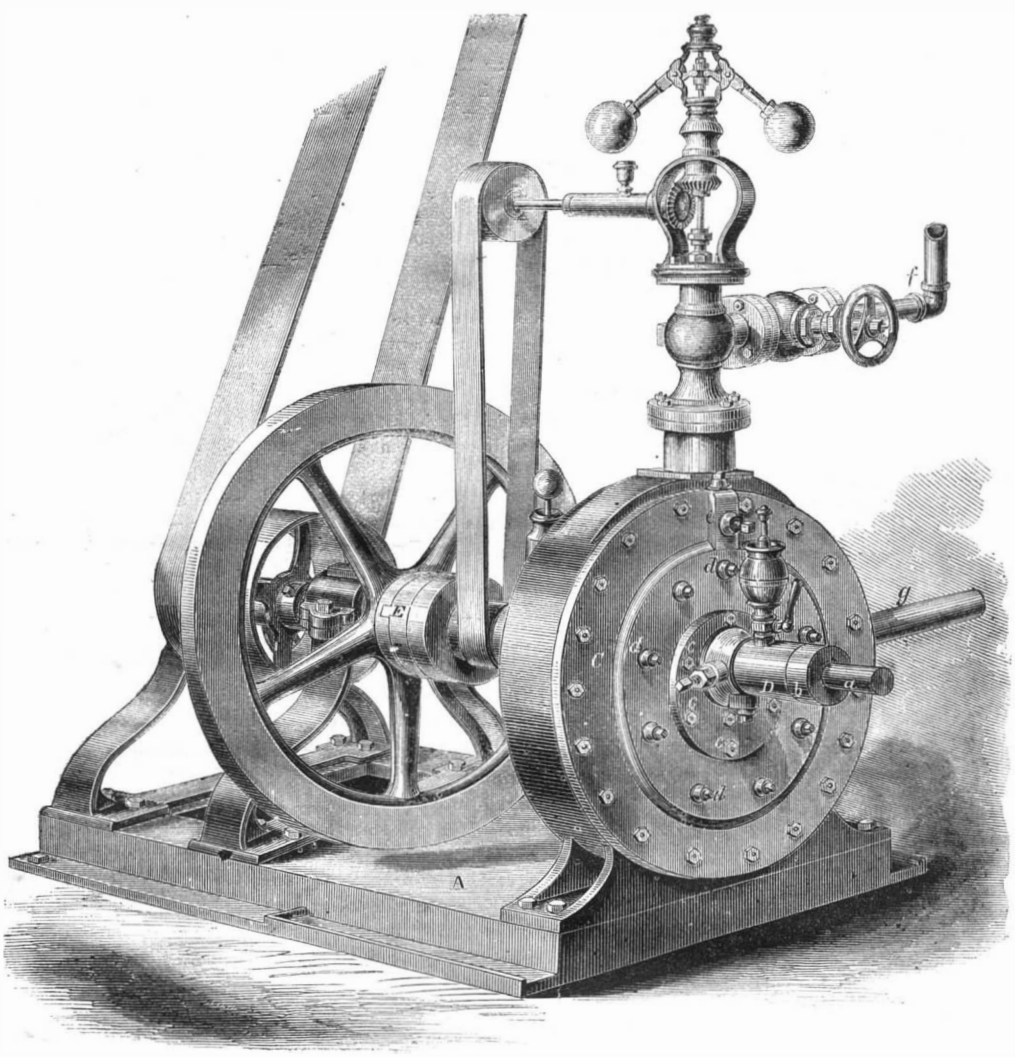


Fig. 1

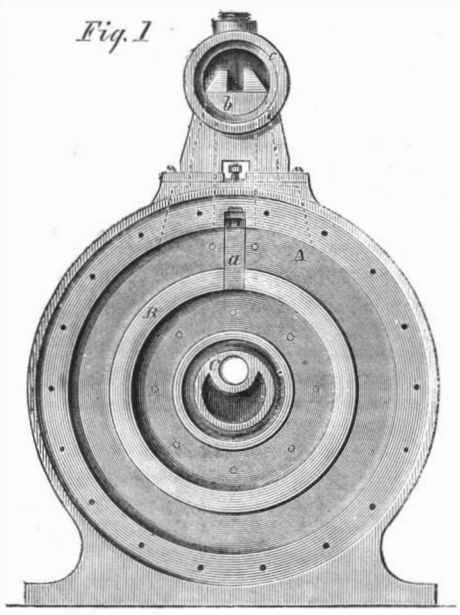
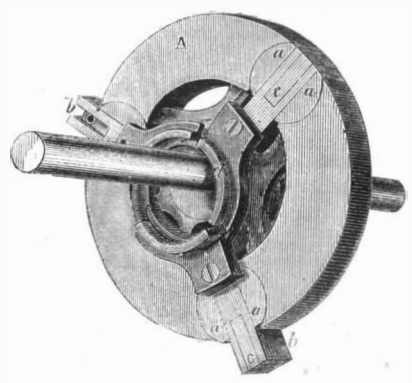


Fig. 2



ROOT'S PATENT ROTARY ENGINE.

By referring to the letters the relation of the several parts will be understood. They consist of the hollow bed-plate, A, to which is bolted the cylinder, B. The cylinder head, C, has a long boss or bearing, D, cast upon it, through which the piston shaft, *a*, projects. Upon this shaft is the collar, *b*. The bearing is tapped on each side and at the bottom, and has set screws, *c*, inserted so that the integrity of the piston, with reference to the bore of the cylinder, is at all times insured. The set screws, whose heads are seen at *d*, are those by which the side packing ring is adjusted. The set screw, *e*, furnishes the means for tightening the abutment packing between the exhaust and steam openings of the cylinder. The regulating apparatus at the top of the cylinder is very similar to that usaully furnished with steam engines and has no uncommon features. At the further end of the bed-plate are the brackets or pillow blocks, supporting the shaft, fly-wheel and pulleys, through which the power is transmitted. The shaft coupling, E, has two ribs, crossing each other at right angles, one on each side, which form a universal joint and prevent the piston shaft from springing through any irregularity of strain on the pulleys.

Figs. 1 and 2, in section, represent views of the interior of the cylinder of the piston, its D-valves, wings and guide rings. In Fig. 1, A, is the inner face of the cylinder; B is the side packing ring which packs the surfaces between the piston and cylinder head, and C is the eccentric or guide which keeps the wings in contact with the face of the cylinder as the piston revolves. At *a* may be seen the abutment packing. The valve, *b*, in the chest, *c*, at the top of the cylinder, is that one by which the motion of the piston is reversed. Fig. 2 represents the piston and its shaft. It is a cast-iron wheel, A, divided at regular intervals by the D-valves, *a*, in which slide the wings, *b*. These are rectangular pieces of cast iron having grooves in each side and upon their faces in which the metallic packing, *c*, is fitted; this packing is pressed outwardly to the cylinder by spiral springs in each. The pistons are connected at their base by circular guides, *d*, to the ring, *e*, to which they are accurately but easily fitted. Over these guides another ring is applied, which keeps them in place.

These details comprise the main features of the invention. It will be seen that when steam is applied, the piston revolves by the action of the steam upon the wings. The piston is not concentric with the cylinder, but *eccentric*, consequently some means must be furnished whereby the ends of the wings shall always maintain the same position, relatively, with the bore of the cylinder; these means are found in the employment of the D-valves, *a*. As the piston revolves around the eccentric, C, the pistons, being

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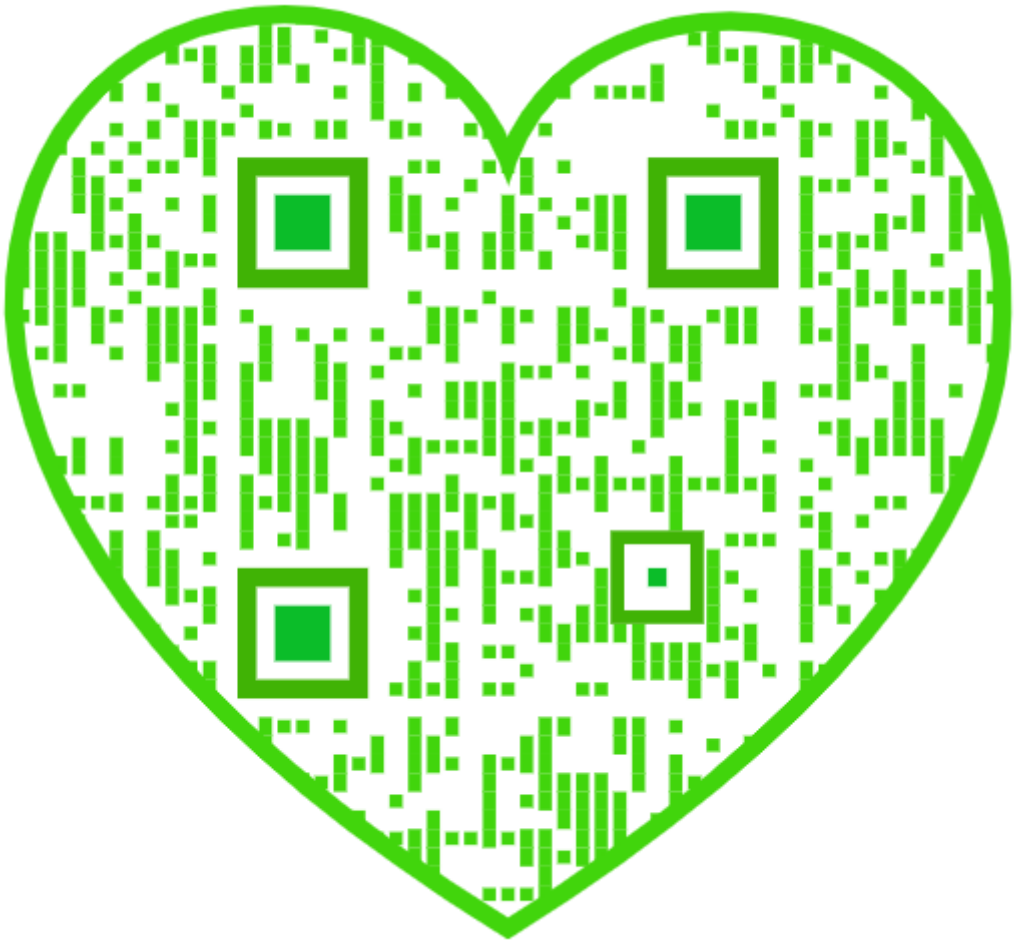

jointed to the guides, slide in and out through the D-valves; these oscillate sufficiently to maintain, at all positions of the pistons, a true bearing of the packing.

The patents for this invention were procured through the Scientific Patent Agency. Further information may be had by addressing Root's Rotary Steam Engine Company, No. 33 Pearl street, New York.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular meeting of the Association was held at its rooms at the Cooper Institute, on Friday evening, January 16; the President, Mr. Tilman, in the chair.

LOCKS.

Mr. BULL—Mr. Chairman, I proposed this subject of locks with a view of getting some information on the subject from a gentleman of the very highest eminence in this department. I have the honor of introducing to the meeting Mr. Hobbs.

The CHAIRMAN—Mr. Hobbs will have the floor.

Mr. HOBBS—I came here, Mr. Chairman, with the expectation of participating in a discussion on the subject of locks, and not with a view of delivering a discourse on it.

Mr. BULL—I hope Mr. Hobbs will favor us with some remarks on the subject.

Mr. HOBBS—Without models or drawings, Mr. Chairman, it will be impossible to explain the details of construction; I will, therefore, confine myself to the general principles of security against picking. All locks may be divided into two classes. The first class is that of locks with wards, in which fixed obstructions are secured in the box or about the key-hole, to prevent the key from turning unless openings are cut out from the bit to correspond with the wards. These locks have been made in great variety, and the wards have been fashioned in very ingenious forms to make it difficult to fit keys to them. But the difficulties are easily overcome by introducing a blank key with a coating of wax and turning it against the wards, which impress their positions and forms upon the wax. A skeleton key is then made, not to fit all of the wards, but simply with the bit constructed to pass them, by which means the lock can be opened. This class of locks has been abandoned where great security is required.

In the other class of locks the obstructions to the motion of the bolt are movable. These movable obstructions are usually called tumblers, but why they should receive this name I do not know; they certainly do not tumble. But whether tumblers, latches, pins, slides or wheels, these locks belong properly all to the same class, though they have been made in endless variety. In the most simple the tumblers or latches must be raised high enough and no harm is done if they are raised higher; but a more difficult lock to pick is that in which, if the tumblers are raised too high, their hold upon the bolt is renewed. In another variety of this class the tumblers move partly in one direction and partly in the other.

The senses that can be made available in lock-picking are seeing, hearing, and feeling, and all the devices which have been invented for increasing the security of locks have been intended to baffle these senses. All locks constructed up to a certain period can be opened by feeling the pressure imparted to the obstructions by the effort to withdraw the bolt, or by tracing the impression left by the key along the bellies of the tumblers. But these operations were prevented by constructing locks without keyholes; the obstructions being adjusted by means of a dial and index on the outside, or by having the keyhole entirely closed during the movement of the bolt, so that the pressure on the obstructions could not be detected by feeling. These varieties of locks have been opened by measuring the motion of the bolt by means of a micrometer. Micrometers are made to multiply 20,000 times; so that if the bolt moves a distance equal to the thickness of a sheet of tissue paper, the instrument indicates a thickness of 20,000 sheets.

In order to make a secure lock it is necessary to know all of the methods of picking. As soon as lock-makers discover any new method of picking, new devices are introduced to guard against it. The locksmiths thus far have kept far in advance of the burglars in the knowledge of lock-picking; no burglar ever having picked the best lock of the time.

The ward lock is very ancient; I have seen those that were taken from the ruins of Herculaneum and Pompeii, and they were in common use among the Romans. The first lock with movable obstructions was Egyptian. There is one in use in Egypt now, which is a very good lock. The bolt is furnished with pins, and the key has pins to correspond, and if the pins are pushed too far into the bolt, those in the key enter the holes and stop the movement of the bolt.

Mr. BUTLER—The Egyptian locks are made of wood, are they not?

Mr. HOBBS—Generally of wood, though I have seen them of iron. I might give you some account of my adventures in England, but I will not tire your patience.

[Cries of "Go on!" "Go on!" "Go on!"]

The great excitement at the Exhibition of 1851 was caused by the picking of the Bramah lock. As I was walking down Picadilly, I saw a sign in a window which I read as a very fair challenge to pick the lock. I went in and asked the attendant if they would really give 200 guineas to any one who would pick that lock? He replied:—

"Can't you read?"

"Yes," said I, "I can read, but I do not believe everything that I read."

I asked him if he would allow me to look at that lock, and he handed it down. I took out my knife and began to feel of the slides, when he interrupted me with the remark:—

"If you want to try to pick the lock you can have a chance at it in a room with our foreman, but you can't be fooling with it here."

Then a gentleman came forward, and asked me if I was a lock-maker. I told him that I was not, and asked him if they really meant to offer the reward of 200 guineas, according to their placard. He said that they did, when I remarked that I should like to have a chance to try it. He said:—

"Perhaps you did not observe the terms of the card."

I then examined it more closely, and it read thus:—"The artist who will produce an instrument that will pick this lock, shall receive 200 guineas reward the instant that it is produced."

I remarked, "I certainly did not observe the terms of your challenge; I supposed that it meant something, but I see that it does not. The public suppose that you offer to give 200 guineas to any one who will pick that lock. Now you will either have to say that, or I will make you take down that sign."

It so happened that on the following day the London *Times* had an article describing a case of jewels belonging to Hope, the banker, and in the course of the article it was stated that the case was secured with one of Chubb's locks; the remark being added, "If we understand the matter rightly, an American gentleman throws down the gauntlet and offers to pick both Chubb's and Bramah's." This questioning the security of the locks was too much for both, and Chubb and Bramah each published a letter in reply; Bramah's letter closing thus:—"If the American gentleman or any other person will pick our lock he shall receive the 200 guineas reward."

With a paper in my hand containing this statement, I called at Bramah's establishment and demanded an opportunity to test their lock, and to avoid all disputes suggested the appointment of arbitrators, to make arrangements and decide upon the fairness of the test. This proposition was acceded to by them, and Messrs. John Rennie, Dr. Black and Prof. Cowper were appointed. The lock offered for testing was a large padlock with eighteen slides, the keyhole being five-eighths of an inch in diameter, and the drill pin one-fourth of an inch. Thus the space around the drill pin was only three-sixteenths of an inch in width and was divided into eighteen sections, allowing very delicate instruments only to be introduced. In their ordinary locks the spring to press the slides up is of a strength of from one to three pounds, but in that lock it was of a strength of fourteen pounds, and the great difficulty was in getting instruments small enough to enter the space, and, at the same time, sufficiently strong to overcome the pressure of this spring. It took me fifty-six hours to prepare the instruments and open the lock, after which I locked and unlocked it three times in one hour, in presence of the arbitrators. After the lock was opened, the owners fell back on their original challenge, saying that the offer was for any instrument that would open it, and I had used instruments. But the arbitrators decided that I had complied with the terms made with me, and that the money must be paid. It was accordingly paid, and I, perhaps foolishly, took the gold down to the Crystal Palace and put it into my case. In all the articles that were published on the subject, there was only one that scratched me. The *Chronicle* remarked that Mr. Hobbs had opened the Bramah lock and received the 200 guineas, and, with a true Barnum touch, had exhibited the gold.

In England, as well as in this country, all sorts of people—lawyers, doctors and merchants—are constantly inventing unpickable locks. When I was there I received one day a letter from Mr. William Brown, of the firm of Brown Brothers & Co., requesting me to call upon him. I went quite elated, thinking that I was going to sell the firm a lock. After talking a while Mr. Brown told me that he had invented a lock, which he proceeded to describe to me, and then asked my opinion of it. I told him that I could not judge of it without seeing either a model or drawings. He asked me directly if I could pick it, and I did not say that I could, although I was satisfied from his description that it could be easily opened. Some time afterward I saw a report of a meeting of the Liverpool Archæological Society, at which Mr. William Brown read a paper on locks. The paper was mostly occupied with an account of his own lock, and in it he said that he had explained the lock to Mr. Hobbs and asked him if he could pick it, and he did not say that he could. From this Mr. Brown argued that it could not be picked. Not long afterward I went to Liverpool and called on Mr. Brown.

"Ah, Mr. Hobbs," he said "you are the very man I want to see. I have had a new safe made and have had one of my locks put on to it. I want to show it to you."

It was a dial lock, with a wrench to throw forward the bolt. Said Mr. Brown:—

"What do you think of it; can it be picked."

"I do not know," I said, "whether it can or not. I suppose you do not consider this wrench is anything?"

"Oh no," said Mr. Brown, anybody can get that."

"Well, if I was going to try to pick the lock, I should put on the wrench in this way, and attempt to move the bolt. Then I should feel of these dials with the other hand."

Presently the bolt moved a little way.

"Ah," said Mr. Brown, "you are no nearer to it now than you were in the beginning. That is the very thing about this lock."

"Yes," said I, "I understand, the wheels have false notches."

I kept him engaged in conversation, telling him how I should try to pick the lock, and he explaining that it could not be picked. Presently his cashier came and told him that a gentleman wanted to see him; and, just as he turned to leave, the bolts flew back. He turned round at the noise and I quietly remarked to him that he had better lock his safe before he left, as I did not like to be left with so much money before me. The whole affair occupied less than ten minutes.

Mr. BUTLER.—The object of making locks like that, without a keyhole, is to prevent them from being blown up with gunpowder.

Mr. FISHER.—When gunpowder is used, is the safe generally destroyed or is the lock merely blown open?

Mr. BUTLER.—The door is very apt to be blown off. I remember one case up the North River, where a lumber yard was robbed. The safe was taken from the office and blown up, and a large fragment of the door was found on the top of one of the piles of boards.

Mr. STETSON.—Do the burglars usually succeed in getting the treasure without interruption when they blow up a safe?

Mr. BUTLER.—They usually smother the noise by covering the safe with cloth. They then secrete themselves till they are certain that no alarm has been given, when they return and take the treasure.

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Mr. BULL.—What has become of the lock that was offered here to be picked some weeks ago?

Mr. MCWILLIAMS.—I have more orders for my locks than I can fill, and am busy enlarging my works, but as soon as I get time, I intend to bring the lock here and offer it for trial.

Mr. BULL.—I should like Mr. Hobbs's opinion of that lock, for if it cannot be picked I should like one on my front door.

Mr. HOBBS.—That is a tumbler lock with false notches in the tumblers, and possesses the same amount of security as all locks of similar construction. To pretend that such a lock is unpickable is simply ridiculous. I have no doubt, however, that any well-constructed lock with four or more notched tumblers is sufficiently secure for any street-door.

THE MINING OF COAL BY MACHINERY.

It has been stated that one cause of the high price of coal, at present, is owing to a deficiency of labor in consequence of a large number of miners having gone to the war. This has led several persons to cogitate the subject with reference to the employment of machinery for mining, so as to mine a larger quantity of coal with fewer hands. In relation to this subject we have lately received several communications in which inquiries were made as to whether we knew of mechanism ever having been employed for such a purpose. We answered that we had been informed of a machine for mining coal being in use in one of the English mines, but we knew nothing about its construction or mode of operation. We have now received some positive information respecting it from the Leeds (England) *Times*, the editor having visited the colliery of West Ardsley, where it is in operation. The following are some extracts from the *Times*:—

This coal-cutter has now been at work for some months, and the results are wonderfully satisfactory. Of its capability for "baring," "holeing" or "kirving," there can be no question, for its efficient workmanship has been beyond all doubt established. In the working of coal mines it is required to make longitudinal horizontal grooves, and also vertical or upright grooves communicating with each other, so as to divide the upright face of the work into sections bounded on the two sides and at the lower and upper sides with grooves of such depth or extent as is required for determining the size of the sections, which shall afterward be removed by blasting or otherwise from the upright surface which is being worked. The invention consists of a compressed air engine, with picks or cutting tools mounted on a carriage which runs on a tramway in the bank, such picks being arranged to cut longitudinal, horizontal and also upright grooves to the desired depth or extent into the upright face of the work, and thus to divide the work to be done into rectangular sections, each section being bounded by grooves on three or four sides. On the carriage can be applied any required number of picks on lever handles, moving on axes; the lever handles being, by preference, crank levers, so that at one end the pick is applied, at the other the lever is acted on directly—hence, as the carriage is moved at intervals along the face of the work the picks make the requisite horizontal longitudinal grooves in the upright face of the work. The cutter is so framed that a pick can be worked either on the right or the left-hand side of the bank, and this pick can also be elevated or depressed, so as to suit the ordinary or extraordinary dip of the strata. We saw it working for upwards of half an hour, but the test we applied was of a quarter of an hour's duration, and we found that in that time the machine cut a groove eighteen inches deep for a length of nine yards right through the shale underlying the coal. This is a most extraordinary result. The cutter was worked by one man, the compressed air being applied in vulcanized india-rubber movable pipes from iron tubes laid down in the principal workings. It is perfectly astounding with what regularity and precision the machine works. The man in charge of it moves a wheel, by which the active motive power is from time to time advanced on the face of the bank, and a boy can follow in the rear and with his slight scraper can pull out of the groove the rubbish of the shale thus made. We do not despair of seeing the time when the cutter can be employed for straight work, for, in point of fact, such an arrangement of the principle is a matter of detail. From the speed with which the implement travels, and the perfect immunity of life with which it is accomplished, we have no doubt that a considerable change in the way of working and winning coal must necessarily follow its its adoption.

The cutting tools are operated by compressed air which is supplied by an engine three-quarters of a mile distant—the pressure of the air being 45 pounds on the inch. Such a machine dispenses with the employment of several miners; and the compressed air supplied by the engine assists to ventilate the mine.

Our Manufacturing Business.

The following interesting extracts are condensed from the *U. S. Economist*.—

"The trade of the past season in domestic manufactures has generally been of a satisfactory character. The aggregate number of yards of cotton goods sold has been little more than half as much as usual, but with prices 100@200 per cent. higher than they were two years ago, the aggregate business in dollars and cents has seldom been exceeded. The season's business in cotton goods has been satisfactory to manufacturers, notwithstanding the fact that more than half of the cotton spindles in the country are and have been idle. The stocks of goods and cotton on hand, which in many instances were very large, have realized, under a constantly advancing market, such enormous profits over their original cost, that large factories have seldom done better when all the mills of the country were in full operation, and selling their products as fast as they could turn them out. The mills that were fortunate rather stumbled into their good fortune, and succeeded far better than was ever imagined. The profitable nature of the season's business can be more definitely apprehended from the following statement of semi-annual dividends declared during the last two or three months by some of our leading cotton goods corporations:—

	Amount of capital.	Dividend, per cent.
Naumkeag Steam Company	$700,000	66
Pepperell Company	1,000,000	50
Bates Manufacturing Company	800,000	45
Nashua (N. H.) Mills	1,000,000	30
Jackson Company	600,000	25
Boston Manufacturing Company	450,000	20
Lawrence Manufacturing Company	1,500,000	20
Manchester Print Works		20
Laconia Company	1,000,000	20
Massachusetts Mills	1,800,000	20
York Manufacturing Company	1,200,000	20
Hamilton Company	1,200,000	15
Appleton Company	600,000	15
Merrimack Company	2,500,000	10
Lowell Company	300,000	10
Bartlett Mills		10
James Mills		10
Globe Mills		10
Everett Mills	750,000	10
Great Falls Manufacturing Company	1,500,000	10
Stark Mills		10

"We believe the first four—all of which mills have been employed on Government contracts—are enot semi-annual. The usual range of semi-annual dividends has been from three to six per cent., seldom exceeding the latter rate. A few dividends smaller than those in the table above, have been declared, but the list we give comprises the larger portion of those that are yet made known.

"The production of cotton goods since the commencement of the war has been quite light, and is lighter this year than it was last. At one time during the present year the production was down so low that only 20 per cent. of the spindles of the country were in operation. At the present moment the production is over 30 per cent.

"The woolen goods manufacturing interest has not prospered so well as that in cotton goods, but has fared fairly, and manufacturers are quite generally satisfied with the results of the season. With the exception of fancy cassimeres, stocks are sold out unusually close, and have realized a large advance over ordinary prices. Indeed fancy cassimeres are about the only goods whose sale has been unsatisfactory. These goods have advanced less than any other description of dry goods in the market, and even at these comparatively low prices have not sold freely. In nearly every other department of the woolen goods trade business has been active, and large profits have been made. Many of the manufacturers had large stocks of wool on hand, some of them a year's supply, before the rise in this staple was great, which was of great advantage to them in their productions.

"The prospect for the domestic woolen manufacturers for next season is decidedly encouraging. Previous to 1861 our imports of woolens for men's wear averaged nearly $10,000,000 per annum. With the present rates of duty and exchange it is impossible to import in considerable quantity any woolens of which similar styles and qualities are made in this country, without making a difference of 20@30 per cent. between the cost of the foreign and domestic."

How to Pay Taxes on Machinery.

Do you know how to do it? It is a very easy matter. You bought a valuable reaper last spring or the spring before last. With it you reaped your hundred or more acres of wheat, your oats, barley, rye; then cut your hay for winter feeding. It did its work admirably. Perhaps once or twice a bolt got loose or the knives needed sharpening, so that ou were hindered a few hours, but as a general thing it performed entirely to your satisfaction. You made money by it, or at least you saved money, which is the same thing in the end. Well, have you got to buy another machine next spring? Perhaps not, but at any rate will you not be obliged to pay 20 or 30 per cent on the first cost of the one you now have, to keep it in repair during next season's work? And the succeeding season at longest you must have a new one, and pay for it the advance in the price that manufacturers may be obliged or may see fit to put upon it. Did you stock your farm anew last spring with plows, harrows, shovels, spades and hoes, with which you had only to "tickle the soil and it laughed with a harvest," and must you go through with this buying process next season and all the seasons that are to follow, and each one pay more dearly for them?

Did you invest in a new hay rake that piled up the windrows most rapidly and beautifully, and forks that fairly made the men shout with admiration as they tossed the huge fork-fulls upon load and rick? Next haying time must there be new forks and new rakes just when your time is the most precious in the field?

If all these things are to be, will you not say very hard words and very bad words about combinations of manufacturers (perhaps some of them will deserve it) and high taxes that you have been taught to hate all your lives?

If your name is "Shiftless" or "Careless" or you are in any way related to those families, all these things will be. Rakes and harrows will be toothless, forks will be broken, shovels, spades and hoes missing, plows rusted and unfit for use, and the reaper rickety and ruined—and why? Because this whole catalogue of implements and almost all that you use not here enumerated, will be out on the prairie or kicking about the yard, through the whole winter without so much as a shingle or a wisp of prairie hay to shelter them from the sun, rain and snow. And we will venture the assertion that there will be enough farm machinery thus ruined in the next four or five months, in the West, to pay the entire extra tax on tea, coffee (we had almost said sugar also, but sorghum has paid that already), dry goods and machinery, that the war will bring upon our farmers for the next year.

If we have not sufficiently intimated the way to avoid all this coming taxation, plainer language would avail nothing and we leave you to the tender mercies of the tax-gatherer in whatever form he may appear to you.—*Prairie Farmer.*

Specie in the United States.

The quantity of specie in the United States at the present time compared with former periods is as follows:—

Amount of specie existing in the United States at the commencement of 1849		$122,000,000
Products of California mines, from 1849 to present time		1,047,000,000
Other sources of supply within the United States to present time		56,000,000
Amount imported from foreign countries during the same period		107,000,000
Amount introduced by immigrants, during the same period (3,600,000 immigrants, at $30 per head		108,000,000
Grand total		$1,440,000,000
Amount exported to foreign countries from 1849 to the present time	$668,000,000	
Loss by wear and tear of coin, by consumption in the arts, and by fire and shipwreck, during the same period	56,000,000	—724,000,000
Amount of specie existing in the United States at the present time		$716,000,000

Commercial Statistics of New York.

	1862.	1861.
Import of Foreign Goods	$173,862,000	$125,688,000
Less re-exported	7,755,000	7,309,000
Total for this market	$166,107,000	$118,379,000
Export of Produce	149,178,000	131,236,000
Export of Bullion	60,438,000	4,236,000
Import of Bullion	1,391,000	37,088,000

The large amount of about sixty and a half millions of specie exported during the year accounts in a measure for the scarcity of it in currency, as there was but little over one-half of the exported amount obtained from our mines. The amount of California gold received at New York in 1862 was $33,495,271. It should be understood that when gold is a native product it is just a commodity like iron, and as such is an article of merchandise, like any other product.

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THE MANUFACTURE AND CUTTING OF FLINT GLASS.

The benefits which have resulted to mankind from the use of glass are incalculable. It is chiefly by its employment in the telescope that astronomy has become such a sublime and perfect science; while in the microscope it has revealed a living world in a drop of water. Its transparency and hardness render it of essential service to chemistry, as it is unaffected by most acids and other fluids. At certain temperatures it becomes ductile and plastic, and may be formed into vessels of every shape and size. In domestic life its use contributes to health and cleanliness as it reveals impurities in the water we drink; while in the mirrors of our rooms it reminds us of that attention which is required to personal appearance. Two centuries ago, glass was unknown in the windows of houses, excepting those of cathedrals and the mansions of nobles. The early settlers of North America used oiled paper, linen cloth and louvre boards in their windows.

The manufacture of glass is an ancient art. It is supposed to have originated in Egypt, as beads and other ornaments of this substance have been found in mummies which are known to be over three thousand years old. The art of blowing glass into bottles and beautiful vases, and imitating precious stones is very old. Drinking cups of glass, chased and ornamented with figures were made at ancient Thebes, where there are still remains of old paintings showing the ancient glass-blowers at work. From Egypt this art was carried to Italy, and Venice became famous for its beautiful colored glass manufactures. The art subsequently found its way to France, Germany and England in the sixteenth century. In a pamphlet published by Deming Jarves, of Boston, in 1854, there are some very interesting reminiscences of glass-making in America. He states that soon after the Revolution, Robert Hewes, of Boston, erected a factory in New Hampshire to make window-glass, but it proved a failure. A German named Lint erected the first successful window-glass manufactory at Boston in 1803, and "Boston window glass" soon acquired a high reputation. Jarves states that the wonderful mystery attached to the art of glass-making followed its introduction into America. "The glass-blower was considered a magician, and myriads visited the newly-erected works and came away with an improved idea of an unmentionable place and its occupants." The successful production of window-glass in Boston led to the manufacture of flint glass by Mr. Thomas Caines, an English operative, who erected the first furnace. In 1823, the first flint-glass manufactory was established in the city of Brooklyn, N. Y., by Mr. Gilliland, whom Jarves says is the best glass-mixer in the United States. Brooklyn flint glass has acquired a world-wide reputation for transparency and beauty. The first prize was awarded to it at the London Exhibition in competition with Venetian, Bohemian, French, German and English glass. Last week we visited the manufactory where this famous flint glass is made, and will give a brief account of the operations of molding, blowing and cutting of glass.

The factory, conducted by Messrs. Gould and Hoare, is situated near the lower end of State street in Brooklyn, and is a large brick structure several stories in hight. The furnaces for melting the glass—and where the molding and blowing operations are performed—are situated in the rear part of the factory. Each furnace is a round structure, enlarged at the base and tapering conically toward the top. There are openings at several places around the sides, and coal is used for fuel. The materials of which flint glass is made consist of white sand (obtained from Berkshire, Vermont), pearl-ash, oxide of lead and some other ingredients. The proportioning of these materials is an art requiring much experience and skill. They are placed in a large pot made of Stourbridge clay, and about one tun of material is melted at once. We only witnessed the operations of molding tumblers and blowing lamp chimneys, these being the articles which were being made during our visit.

In molding tumblers, a boy takes a long iron rod, thrusts its end into the pot in the furnace and gives it a few turns, when it gathers a small ball of molten glass upon it. It is now carried a few steps to the die press, which consists of a spring lever with a conical die block in it and two moveable iron molds on the table, and it is operated by one man. The boy drops the ball of molten glass from his rod into one of the molds, which is then pushed carefully and centered below the die block; the operator now brings down his lever block into the center of the mold, and it forces the molten glass into shape between the sides of the mold and the conical iron block in the press. The operation is similar to the die-stamping of metals and the molding of clay. The lever is now raised, the molded tumbler is left in its mold, which is withdrawn from the press and gently inverted upon a tablet, when it is discharged. These operations are executed very rapidly. Another boy is now ready with a second ball of molten glass for the second mold, and similar operations are repeated. The tumblers are then carried to the annealing oven, where from a high heat they are gradually cooled—the time of annealing occupying about eight hours. The annealing oven is about forty feet in length, and the tumblers are slowly drawn through it upon a carriage.

The chimneys of lamps are formed by blowing. A boy takes a straight iron tube, about five feet in length, dips one of its ends into the pot containing molten glass, gives it a few turns, and winds a sufficient quantity upon it to make a chimney. It is then carried to a smooth iron table on which the glass is gently rolled to smooth it; then the blower puffs a blast down the tube which expands the glass bulb like a bubble of soap; he then gives his tube a few swings like a pendulum, when the plastic glass at its lower ends elongates into a tube. In order to form the swollen part on its lower end, the operator rests it upon the floor and gives a slight puff down his tube, when it bulges out in the well-known form of a glass chimney—a globe with a long neck. The lower end is now broken off and opened with a tool, and the neck is also separated from the blowing rod. The chimney has now to undergo two other operations, another furnace with round holes in it being used for this purpose. A second operative places the chimney upon an iron rod and thrusts its lower end into the mouth of a furnace until it becomes quite plastic with the heat. He now withdraws it, lays his rod horizontally upon an iron bench and rolls it with his left hand, while with his right he spins out the mouth of the chimney, and turns the flange upon it with a tool which also gages the size. A boy now presses a small red-hot iron disk upon the end of a rod against the under flange of the chimney, and it sticks fast to it, when the chief operator thrusts its neck into an open hole in the same furnace, gives a few turns, takes it out, rolls it with his left hand upon the table, and with his right guiding a tool, he smooths the neck of the chimney; then he places it upon a bench and disengages it finished from his rod in a dexterous manner. In this way glass lamp chimneys are blown and finished without being placed in an annealing furnace. A set of operatives consisting of two men and five boys make seventy-five dozen of chimneys per day. Beautiful flint glass bottles, &c., are made by blowing, like the chimneys, the operations being varied for different forms and sizes. We will now describe the operations of cutting flint glass.

The cutting of glass is conducted in the second and third stories of the manufactory. Here let us premise that glass-cutting is not executed with diamond or steel cutting tools, as many persons suppose. Glass-cutting is a system of grinding with small revolving stones. The main cutting room has a row of wheels on each side, numbering altogether over fifty. These are driven by belting, just like grindstones. As much light is necessary to perform the operations, each wheel is placed before a window, and above it, is an inverted conical trough containing water, a stream of which is made to trickle upon the stone. The stones are small and narrow; and some are plane in the face, while others are formed with a beveled circular edge running round the middle. We saw bottles, decanters, stoppers and various other articles undergoing the cutting operations. Diamond-checkered bottles, flowered globes, prismatic stoppers and all the various patterns are cut by these fine revolving stones. A bottle or other article is held by the glass-cutter against his revolving stone, and the pattern is ground upon it according to the skill of the operative. The face of the wheels or stones are different in shape for the grinding of different patterns. The stones for fine grinding are obtained from Craigleith quarry in Scotland, the coarse ones from Newcastle, England. The cutting of glass by grinding renders the surface dull; it is afterwards polished on a buffing wheel with a powder composed of the oxides of tin and lead. Some articles, however, are cut with dull flowers and figures upon polished surfaces. The holes in the necks of crystal bottles are ground accurately by being centered in a revolving chuck, and stoppers are ground in the same lathe to fit air-tight. Globes for lamps are ground dull on the surface (to tone the light) by being placed in a lathe, and made to revolve while a pad containing sand and water is held against them. Some globes are also rendered dull in their interior. This is effected by placing a small quantity of sand and fine gravel with some water in each, then placing several in a long narrow box in which they are snugly secured among hay, and the box is then made to revolve. The sand and gravel seek the center of gravity, while the globes in revolving rub against the sand and gravel.

The very finest cutting on glass, however, is here executed with a small revolving copper disk in a lathe, the grinding agent being oil and emery. Beautiful patterns, figures, names, &c., are thus executed on polished crystal articles. Great skill and taste are demanded in such operations. The cutting resembles the lines executed on steel plates with a graver. We examined one small drinking-cup which was a splendid specimen of glass-cutting. Its sides were laid out in panels; in one was the figure of a deer; in another a glass-house, and in another a cathedral. A cast of all new patterns is taken in plaster, so as to reproduce the article should it ever be called for. The first-class articles manufactured in this establishment are as translucent as rock crystal itself. The cost of each chiefly depends upon the labor bestowed upon it in the cutting operation. Glass is certainly one of the most beautiful products of human ingenuity. Its production in such articles involves chemical and mechanical knowledge of an intricate character. The chief ingredient of glass is sand or silica; it is one of the most fractious substances in nature, as it cannot be melted in any heat by the blow-pipe; and yet the glass-maker, by incorporating it with some alkaline ingredients, renders it as plastic as wax, and forms it into a thousand beautiful patterns. We have no further space at present to give statistics of the glass manufacture in this country or to describe other operations. At some future opportunity we may recur to the subject.

Eclipses during the Year 1863.

There will be four eclipses this year as follows:—

1. A partial eclipse of the sun, May 17th. Invisible in the United States, except in California and Oregon. At San Francisco it begins at 6h. 57m., morning, and ends at 9h. 53m.

2. A total eclipse of the moon, June 1st, in the evening. Visible in part of the United States, but generally as a partial eclipse. The shadow will appear upon the moon at the time it rises, covering about two-thirds of its surface and passing off in about forty-five minutes.

3. An annular eclipse of the sun, November 11th. Invisible in America.

4. A partial eclipse of the moon on the morning of November 25th. Digits, 11.47. Visible generally throughout the United States.

Expensive Experiments.

The London *Mechanics' Magazine* states that, after an expenditure of $40,000,000 on experiments with the Armstrong gun, the inventor has failed to produce a naval gun superior for practical purposes to the old 68-pounder; and that Mr. Whitworth, of Manchester, a private manufacturer, has, by his own skill and means, achieved a success which Sir Wm. Armstrong has failed to do, though backed by the long purse of Government patronage. Our readers may remember that this same Sir William Armstrong once proposed to abolish the patent laws of Great Britain; thus exposing inventors to be robbed unceremoniously of the fruits of their ingenuity.

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STORMS.

(Concluded from page 52.)

WATER-SPOUTS.—The writer of this article has seen on the northern lakes, during a period of fifteen years, some six or seven water-spouts. One on Lake Ontario was about fifty miles from an island; the others were all seen among the groups of islands situated in the western end of Lake Erie. None of these spouts were, apparently, more than six feet in diameter; the greatest length was judged to be not less than 500 feet. Two of the largest which were seen near Point Au Pelee Island, were examined at a distance of about a mile, with a good ordinary telescope. A distinct and clearly-defined white line, or lighter shading, running through their centers, showed conclusively that they were of a tubular form; the white line or hollow center was about one-third the diameter of the whole. They were perfectly smooth, and, viewed with the glass, quite transparent, and good representations of immense glass tubes. This hollow center would go to prove that they have a centrifugal motion, the same as in the experiment of the bucket, were there any doubt on that point. There was no perceptible variation of size, in either tube, from near the surface of the lake to where they disappeared in the clouds, a distance of about 500 feet. An occasional slight crook in the tubes showed by the rate of its ascent, the perpendicular velocity of the water, which was not rapid but quite moderate. These were magnificent specimens. Professor Henry has well said, in speaking of commotions of the atmosphere:—"Is it possible, in the present state of science, to give a rational explanation of the various phenomena exhibited in those apparently fitful and complex commotions? How is it possible that the soft and balmy air, which offers scarcely the least resistance to the motion of a lady's fan, can yet exert a power sufficient to level with the ground the largest trees of the forest at the rate of 7,000 in the space of a mile, in a single minute, and this destructive energy continue, as it has been known to do, for a distance of many miles?"

Miniature water-spouts have been produced artificially by means of electricity, and it is quite certain that electricity has much to do with the formation of that attendant phenomenon of the whirlwind. When the whirlwind is formed and its gyrations become so rapid that particles of air are thrown out by their centrifugal force, so as in part to overcome the atmospheric pressure, horizontally, leaving a center of rarified air; then is electricity brought into play; then the positive electricity of the upper regions finds comparatively free access to the earth; then this center of rarified air, running from the earth's surface to a great hight, becomes a highway for the action of electricity, which, in such case, must add to the energy of the storm. As far as heat is concerned we may figure out the problem, the amount of its energy perhaps; knowing that a certain difference of heat in the lower and upper stratums gives a certain difference of specific gravity, and a certain difference of specific gravity of course gives a certain amount of energy where there is chance for its action; also knowing the velocity with which air moves under certain pressures (1,280 feet per second into a vacuum), we may find the effect due to heat alone. Knowing also that the temperature decreases about one degree for every 300 feet elevation, we may find to what hight a certain amount of heat would carry a volume of air, so as to find a like temperature, by its expansion; for instance, 100° difference of temperature would give an elevation of 30,000 feet.

Water-spouts are formed only in small whirlwinds, or in the incipient stage of large ones; as in large ones the calm or rarified center soon becomes too large for the formation of spouts of like proportions; and also the excess of electricity must become spent soon after the rarified center is established. One proof that such spouts are formed in the early stage of whirlwinds is that the spouts are most frequently found near islands—the most common starting point of the whirlwind, which is the cause of this phenomenon. One hundred degrees difference of temperature between stratums would give, after the establishment of the orifice, a motive pressure of about two pounds to the square inch; this would give a vertical velocity of 480 feet per second, but of course the centrifugal velocity would be much greater. A motive pressure of two pounds would give a center rarefied to just that extent, that is before the center has become greatly enlarged. The difference of atmospheric pressure immediately beyond this rarefied center must force up into it a column of water over four feet in length, the internal surface of the revolving air tube takes hold of this short column and gives it a circular motion; as the centrifugal velocity of the water shaft is increased, its diameter is also increased by means of its centrifugal force, and it crowds against the internal surface of the air tube. We all understand that the traction power of a locomotive depends upon the amount of pressure between its wheels and the rails; so in this case the traction power or friction between the two fluids is increased by the increase of pressure; and, as air is eight hundred times lighter than water, with the same motive pressure its velocity or mobility must be eight hundred times greater. The vacuum within the water spout must be spindle-pointed at its lower extremity, as water which would flow up to fill it becomes gradually identified as a portion of the tube. But the decrease of pressure on the external surface of the spout causes a shower of its particles to be thrown off by centrifugal force, and a portion is carried off by the outgoing streams of air. When the revolving air begins to diverge rapidly it must also rapidly lose its rotating motion, as it is then acting in direct opposition to the power which first imparted that motion—the diurnal motion of the earth.

In high latitudes the temperature is sometimes as low as 100° below zero; and within the tropics, or at any point where at the earth's surface the thermometer shows 100° above zero, we can find the same temperature of 100° below, by ascending to an altitude of ten or eleven miles—a short journey for wind to travel by the cut direct. Rotary storms frequently pass from within the tropics to points as far as the forty-fifth parallels, but in such cases they are carried through the calm belts probably by the heat of warm-water currents, and getting beyond the belts must find the upper stratums traveling in a favorable direction, or not in the prevailing direction, and no doubt some originate in the extra tropical regions. Are not some of our westerly storms, described by Professor Henry as "commencing at the base of the Rocky Mountains and sweeping eastwardly over the United States," due to the greater density and specific gravity of air resting against the frozen and ice-clad slopes of the mountains, sliding down said slopes, and establishing a downward current of the cold upper stratum and displacing the lower one, as a strata of water would one of oil? He says "they occur in the winter months when the mountain slopes are laden with ice and snow, and they are immediately followed by a reduction of temperature and a dry air." Humboldt found that a cloud rolling down the side of a mountain in South America was several degrees colder and much dryer than the surrounding air. This phenomenon, Mr. Espy proclaims, "is not only unintelligible, but incredible;" but on the foregoing hypothesis it is easy of solution, and accords with one of the most simple of nature's laws.

ROTARY MOTION OF RIVERS.—While speaking of the effect of the earth's diurnal motion, I wish to mention that at the falls of Niagara and those of the Genesee, at both the upper and lower fall, this effect is plainly to be seen; as after the fall has been passed the water is thrown to the right; there is on the left bank of each, immediately below the fall, a low, flat shore extending some distance into the river from the real bank; and piles of loose rocks and debris are left lying in peaceful and undisturbed possession of that shore, while on the other shore we find a bold and well-swept bank. The banks of the Genesee Falls are very much scooped out immediately to the right, and I have no doubt but that the right bank of the Niagara would be as much so, if it were not for several small islands and the shallow water on that shore, just above the fall, which obstructs the force of the current on that side, although the other features, as stated, are well marked. Where water suddenly starts from a state of rest, is also a good point to observe the effect of this principle; as, for instance, where the waters of a lake empty into its outlet. Where the waters of Lake Huron flow into the St. Clair River, it suddenly starts forward and runs for half a mile southerly, with a velocity of seven miles per hour, and as the water has suddenly changed its position from a point further north or nearer the earth's axis, it is struck by the west bank, which has a greater centrifugal velocity than the point from whence the water is drawn. The mouth of this river has in course of time changed bodily from left to right a distance of more than a mile, as is clearly shown by the clean and abrupt bank on the one side, and its tell-tale track of debris of 2,320 yards in width upon the other side. The mouth of this river is slowly but steadily cutting to the West, and the cause is the diurnal rotation of the earth upon its axis.

F. A. MORLEY.

Sodus Point, N. Y.

Smelting Ores of Gold, Silver, Nickel, Copper, &c.

In separating iron from its ore a flux is mixed with the ore which combines with the impurities, chiefly consisting of silica, rendering them solvent at a high degree of heat in a furnace. The flux and the impurities when combined form a slag, which is a species of glass. As it is much lighter than the metal, it floats upon the surface in the furnace and is drawn off by tapping, leaving the metal to be drawn off under it. This simple process has been attempted several times to be applied in the recovery of gold and silver from their ores, but thus far without economical results. In the treatment of gold and silver ores tedious and expensive amalagating and chemical processes are employed. An improvement in the common modes of treating such metalliferous ores was patented by William Quann, of Philadelphia, on the 16th of last month, which embraces the smelting mode, with the employment of a peculiar flux suited to the nature of the ore. The ores of gold, silver, copper, nickel, &c., frequently contain arsenic, carbon, oxygen, chlorine, phosphorus and sulphur, and also alloys of the metals with one another, so that the reduction of such ores and the separation of the metals requires the use of a very complex mixture or flux, to be described hereafter. Thus a portion of the impurities in the ores are volatile, and must be driven off in a state of vapor; while others are fixed and must be separated by fluxing in the liquid state. The mixture to be employed with the ores in the smelting furnace fulfills both of these conditions. For fluxing ores such as those of gold, silver, copper and nickel, and those of all metals other than iron, the following mixture in kind and quantity is used to each tun of the ore:—Two quarts of wood ashes, two pounds of pulverized wood charcoal, and three and a half pounds of carbonate of ammonia; one quart of oil or resinous matter and one quart of common salt, eight ounces of bone dust or charred bone dust, four ounces of sulphur in powder and one bushel of common sand. These ingredients are varied in proportion, according to the quality of the ore to be smelted. The carbonate of ammonia is used by first dissolving it in water and steeping the ore to be smelted in it for about twelve hours before smelting. It is said to be a powerful volatile flux, and assists to eliminate the volatile impurities, arsenic, phosphorus, &c. The alkaline bases of the salt and the wood ashes act as fluxes for the quartz of the ore to render it soluble at a high heat in the furnace, and thus form slag which floats on the surface. Carbon is used in the flux in three different conditions, namely: pulverized charcoal, oil (or, as a substitute, resin) and animal charcoal (formed by the calcination of bones). This latter contains phosphate of lime, which the inventor has found to be very efficient in the purification and separation of the metals. The sand is used when the slag is observed not to flow freely, on account of the absence of the requisite amount of silica in the earthy components of the ore. An addition of sand in such cases facilitates the removal of the fixed impurities. Sand also excludes the oxygen of the atmosphere from the ore in the furnace. The sulphur is used to remove any iron that may be in the ore. The ingredients described are thoroughly mixed with the ore and submitted to a high heat in a reverberating furnace, until it is observed that the metal is separated from the impurities by the latter floating on the surface in the form of slag or scoria, when the furnace is tapped; the scoria flowing in one direction and the metal into a proper receptacle in another.

THE citizens of Philadelphia have also sent a vessel with a cargo of flour and provisions for the suffering English operatives.

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VALUABLE RECEIPTS.

Domestic Soaps.—Common soft soap is made with a lye of wood ashes and the refuse of the kitchen. In the country, wood ashes are leeched in a barrel with water until a lye of sufficient strength to float an egg is obtained; this is then placed in a kettle and boiled with as much grease as the lye will dissolve. There is no difficulty about making such soap, provided the lye is sufficiently strong, and the boiling continued until the mixture has become ropy when lifted on the spatula that is used for stirring it. A soap of the same character may be made without boiling by placing the lye and grease in an iron kettle in the sunlight for several days, stirring the mixture occasionally. Wood ashes form potash lyes, which only make soft soap. It is well adapted for common purposes, but not so suitable as hard soap for rubbing on clothes or for the toilet.

Hard Soap.—In many families in cities, domestic soap may be made from refuse grease at a small expense. Instead of using wood ashes or potash, a caustic lye of soda can be made, which by boiling the grease in it will make hard soap. The way to make the lye is to mix up about three-fourths of a pound of fresh-slaked lime in a gallon of water, then dissolve a pound of sal soda in another gallon of water, stir the two together, and allow the mixture to settle for about six hours. A white precipitate of chalk will fall to the bottom of the vessel and the clear liquid will be a caustic lye. The grease is boiled in this until it unites with the lye and forms soap, when it may be run into molds. It will form hard bar soap when cold. The quickest way to make caustic soda lye is to boil the sal-soda and the lime together for fifteen minutes, then allow the liquid to cool and settle and thus obtain the clear lye. The great secret of success in soap-making is to use an alkaline lye of sufficient strength and continue boiling until the chemical union of the grease and alkali is effected. This result is known only by ocular examination; it is usual to add fresh lye in making soap, and continue the boiling as the evaporation goes on until complete saponification is effected. In large soap manufacturing establishments the apparatus and processes are so arranged that all the operations go on with clock-work regularity and certainty. Resin is employed as a mixture in common brown soaps. It unites with alkalies and forms a saponaceous compound. It is generally supposed that it makes soap harder than grease alone, but white soaps are made with suet and tallow without resin.

Fancy Soaps.—Transparent soap is made by dissolving hard soap in alcohol. The soap is cut into very fine shreds and stirred among alcohol in which it slowly dissolves forming a clear liquid. By evaporation the alcohol disappears, leaving the soap in a transparent condition. In making perfumed soaps bars are cut down in thin slices, then placed in an iron vessel of a size capable of containing the quantity to be melted. In manufactories it is surrounded with a steam jacket for heating it, but it may also be placed in a vessel containing boiling water. A very small quantity of water is added with the soap, which soon melts with the heat, when it is thoroughly stirred with a stick until it becomes smooth, then it may be colored or perfumed, then it is poured out into molds or run into bars, cut into squares and stamped fancifully in a press. Vermilion dyes soap pink and smalt a blue color. The otto of almonds, at the rate of 2 pounds to 200 pounds of soap, produces almond-scented soap, which many persons suppose is made of the sweet oil of almonds. One and a half pounds of the essential oil of rosemary, added to 60 pounds of melted soap, makes rosemary-scented soap. One pound of fine honey and one pound of the otto of citronella added to 100 pounds of melted soap makes honey-scented soap, which is also pleasant in its effects upon the skin.

The celebrated brown Windsor soap is made by adding 1½ pounds of the otto of caraway, and ½ a pound each of the otto of thyme and rosemary and ¼ of a pound each of the otto of cassaia and cloves to 150 pounds of good curd sorp melted. Any family may prepare its own scented and fancy soap by melting good bar soap in a tin pan placed within a kettle of boiling water, then adding any of the essential vegetable oils—lavender, bergamot, &c., most agreeable, at the rate of 1 ounce to the 5 pounds of soap. Whenever the essential oil or perfume is mixed with the melted soap, the latter must be cooled as soon as possible or the perfume will be evaporated by the heat. All perfumed soaps should be kept in a cool place, and those cakes which are not being used should be wrapped in paper.

Freshly-made bar soap may also be scented cold by cutting it into fine shavings then mixing it in a mortar with the essential perfuming oil. There is no loss of perfume incurred by this method. When thoroughly mixed with the perfume the soap may be pressed with the hand in a small box to form it into cakes. Otto of roses, musk, lemon and almost every known perfume may thus be combined with soap. From such a description toilet soap may be manufactured for domestic use at a comparatively small cost.

Keeping Poultry.

A correspondent writing to the *Country Gentleman* says:—"I keep from one hundred to two hundred fowls, mostly of the black Spanish breed, and keep them confined the year round, but disease is not known among them, and I can assure you that they do fully as well as those kept by others who believe that fowls cannot do well unless they are kept scratching. My yard is only twenty-five by sixty feet, filled twelve inches deep with leached ashes and fine sand. I have a large box containing some thirty bushels of burnt shells and bones, which the fowls have free access to, and when the top becomes too dirty I take it off and put it around my grape vines. My gardener raises six hundred head of cabbage annually, which is fed to them through the winter, and in summer he gives them lettuce—all they want. I have a contract for ten beef heads weekly, and give them plenty of sour milk, in addition to all of which they have free access to a mixture of corn, oats, wheat and barley which is kept in a bin holding some forty bushels, so constructed as to regulate itself and not allow the fowls to waste a grain or to scratch in it. My watering trough is also so constructed as only to admit the heads of the fowls and is always full of pure, clean water, which is of more importance than anything else in keeping poultry healthy.

"A barrel of lime, a bucket and a brush, are indispensable articles in a poultry-house and should be used every rainy day (and oftener during such a drought as we had lately), whitewashing everything but the floor, and using the lime-dust on that. But wash the floor first. I have tried all your vermin preventives and everybody's else, but never succeeded in keeping my fowls free until I found a remedy by experimenting.

"The nests are so constructed as to be all taken apart in a few minutes; they are perfectly smooth inside and out, and once in every two months I have them taken down, cleanly washed and then thoroughly coated with common whale oil, and have never yet seen a louse near them, nor can one be found around my premises. The oil I apply with a common brush, and it can be relied upon as a sure preventive against vermin on fowls."

Wealth for the Farmer.

Messrs. Editors:—The use of common salt as a manure is not new, nor is the use of salt on barn-yard manure new, but, we desire here to show the farmer the superior wealth or value of salt brines to that of common salt. Common salt contains a small portion of lime and magnesia; but if we take the salt brine from cucumbers and sour-crout, we have, besides lime and magnesia, vegetable albumen and a considerable quantity of lactic acid, also a small quantity of butteric acid, which have been formed by fermentation similar to that of milk. Again: if we take barrel pork brine and the brine from salt fish and corned meat, we have in such the soluble parts of such meats and fish. Such brine contains not only inorganic elements as potash and phosphoric acid, but also organic as lactic acid, and especially considerable quantities of albumen, and a small portion of lime and magnesia contained in the salt as an impurity. Now if these brines are sprinkled upon the manure heaps and upon the soil (that is land that does not lay on or near the sea-coast), the land will gradually grow rich, and at a very small cost. To give the action and reaction of the above-named substances on the land, the crops and the manure, is not the object of the present letter. All these salt brines, both in the city and country, are usually waste products, and might be obtained in many instances for the trouble of taking them away.

J. A. & F. Dunworth.

Dobb's Ferry, N. Y., Jan. 12, 1863.

A Complimentary Letter from the Kentucky Sanitary Commission.

Messrs. Munn & Co.:—The Kentucky branch of the United States Sanitary Commission have directed us to present you their grateful thanks for your prompt, kind and considerate attention to their request for information on the subject of a knitting machine. You not only responded to the request, but you have gone beyond all we asked in purchasing a machine far below the selling price, and in promply forwarding it to us. It reached here in good order, and we have no doubt it will fully answer our expectations. For this unasked favor on your part, toward the Sanitary Commission, and, through that agency, to our suffering soldiers, be pleased to accept the grateful thanks of the Kentucky branch of the National Sanitary Commission.

Please find inclosed our check for the amount of the bill; and believe us to be most respectfully and gratefully yours,

T. S. Bell.

Arthur Peter.

Louisville, Ky., Jan. 5, 1863.

A "Timber Hat."

Somewhere about the year 1780 (so runs the tale), a travelling millwright—in those days the king of mechanics—foot-sore, and with the broadest Northern Doric accent, stopped at Soho, a locality once indicative of field sports, but then the engine factory of Boulton & Watt, and he asked for work. His aspect was little better than one of "beggary and poor looks," and Mr. Boulton had bidden him God-speed to some other workshop, when, as he was turning away sorrowfully, Mr. Boulton, suddenly called him back and inquired:—

"What kind of hat have you on your head, my man?"

"It's just timmer, sir."

"Timber, my man? Let's look at it. Where did you get it?"

"I just made it, sir, my ainsel!"

"How did you make it?"

"I just turned it in the lathie."

"But it is oval, man; and a lathe turns things round!"

"Aweal! I just gaur'd the lathie gang anither gait to please me. I'd a long journey afore me, and I thocht I'd have a hat to keep out the water; and I had na muckle siller to spare, and I just made ane."

By his inborn mechanism, the man had invented the oval lathe and made his hat, and the hat made his fortune. He became a distinguished machinist.

Health---Our Feet.

Women are not more hardy than men. They walk on the same damp cold earth. Their shoes must be as thick and warm. Calf or kip skin is best for the cold seasons. The sole should be half an inch thick; in addition there should be a quarter of an inch of rubber. The rubber sole I have used for years; I would not part with it for a thousand dollars. It keeps out the damp, prevents slipping, and wears five times as long as leather of the same cost. For women's boots it is invaluable. But rubber shoes should be discarded. They retain the perspiration, make the feet tender, and give susceptibility to cold. Stand on one foot, and mark around the outspread toes. Have your soles exactly the same width. Your corns will leave you. The narrow sole is the cause of most of our corns. A careful study of the anatomy of the foot and the influence of a narrow sole will satisfy every inquirer. The heel should be broad and long.

Wear thick woolen stockings. Change them every day.

Before retiring, dip the feet in cold water. Rub them hard. Hold the bottoms at the fire till they burn.—*Dr. Lewis.*

Wrought Iron Spikes.—Samuel N. Lightner, of Pittsburgh, Pa., wishes to purchase the most approved machine for making wrought-iron railroad spikes.

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A VISIT TO POMPEII.

A recent traveler (whose name, we regret to say, has escaped us) thus speaks of the interesting city of Pompeii and the excavating operations progressing there :—

Our excursion to Pompeii was performed by railway, and occupied about an hour from Naples. On reaching the Pompeii station, a short walk brings us to the ruined city, which, contrary to general expectation, is found to be at an elevation above the level of the adjoining country. Destroyed in the first century, it was not till about 1750, that any one gave a thought concerning it, and this neglect appears the more surprising, when we are told that part of several buildings remained prominent above the soil, having never been thoroughly entombed. An accidental discovery of painted remains having suggested a regular course of excavation, the process of opening up has been going on for upwards of a century, but under great difficulties as to the disposal of the incumbent earth.

Proceeding up a winding and sloping pathway, cut through masses of rubbish, we come with startling abruptness on the silent and deserted city. A Government officer is imposed on us as a guide at the entrance, and, led by him, we suddenly find ourselves in a paved street environed by shattered walls, doorways, temples, and columns. Walking onwards, we make the circuit of the town as far as it is opened up. Going down one street and up another, crossing this way and that way, we are amazed at the extent which has been laid bare, though a much larger space remains to be cleared. While there was much to surprise and delight—much to instruct and moralize over—I feel a reluctance to impose any account of what has been so often and so minutely described. A mere glance at the more remarkable features of the exhumed city will suffice.

The guide, having drawn attention to the fact of the city having had walls and gates, proceeds to point out a group of four magnificent ruins—the Forum, the Temples of Venus and Jupiter, and the Basilica or Court of Justice. Adjoining are the ruins of the prisons, in which skeletons in manacles were found. At a short distance is the ruin of the theatre, with some handsome columns still standing. The houses of distinguished individuals are also made the subject of special notice; such as of Sallust, Pansa, and the villa of Diomedes in a suburban street, outside the walls. In these and similar mansions of the patrician order are noticed some remains of mosaics and frescoes, the greater part of such decorations having been removed, along with other objects of art, to the museum at Naples. The whole city has, in fact, been cleared of every moveable; and almost every place is as bare as in a house after a removal. The larger mansions have undoubtedly been magnificent, and in their successive courts we see the type of the modern Italian palazzo and French hotel. These superior dwellings extend considerably backward from the street, the access to them being generally by an entrance between the shops of tradesmen. All the shops are of those limited dimensions which are still common in Naples, Rome, and other Italian cities. They consist of an apartment about the size of a coach-house, the front having been entirely open, or with a counter partially running across. At night, all had been closed in with shutters. I do not think there had been any shop windows. Some of the shops seem to have had one or two small apartments behind or above. In several instances the stone-cutters are seen, with large earthenware jars as fixtures. A baker's oven, with remains of a grinding mill, are shown in one of the shops; and from the skeleton of an ass having been found in a recess of this establishment, it is conjectured that the mill had been moved by that unfortunate animal.

From a variety of such disclosures, it is evident that business was conducted in a primitive sort of way in Pompeii—the grinding of grain into flour, and the baking and selling of bread having, as just seen, taken place all in one establishment. Till the present day, as I have already mentioned, things are little advanced beyond this in Rome. In some instances, we see the name of traders on the front of their shops, inscribed in Roman letters in so rough a style as to suggest that they had been executed unprofessionally with a stick or brush. Few buildings are believed to have been more than two stories in height. Generally, nothing remains above the first story, and accordingly the city looks like a collection of short stumps of walls, which, for their preservation, are covered with tiles. In their entire state, the houses had flat roofs, a circumstance which hastened their destruction. On being excavated, skeletons were found in several houses, but not in great numbers; for, as noticed by the younger Pliny in his account of the destruction of the city, the inhabitants generally fled to a distance for safety, many of them trying to shelter themselves from the shower of scorching ashes by carrying pillows on their heads. The skeletons found appear to have been chiefly those of ladies, who, perhaps, had not the courage or power to escape. A number of them when found, had on necklaces, bracelets, and rings of gold. One skeleton was found with a purse of money grasped in its bony hand; the attempt to procure the money having been the probable cause of death.

The streets are narrow, and paved with huge stones in the old Roman style; in some places they are much worn with wheels, and most irregular. Water had been brought into the town by subterranean conduits, which emptied into large stone troughs at the corner of certain streets; and from these public fountains dwellings were supplied by water-carriers. There are back lanes in some of the streets, but no stables have yet been discovered. Possibly, horses were accommodated in the suburbs. One is pleased to see that the streets had *trottoirs*, a very curious fact, for it is only lately that side pavements for foot-passengers have come into use on the continent, seemingly introduced from England. The forming of trottoirs had, therefore, become a lost art in Italy, for in few towns are those useful appendages to a street yet employed. The trottoirs of Pompeii are about thirty inches wide, and raised a foot above the street; in some instances, they are laid with a common kind of mosaic. Corresponding with them in height, there are usually three fixed stepping stones at the ends of the streets. It appears from this that Pompeii was subject to showers that temporarily deluged the streets, and it was therefore necessary to have means of crossing dry-shod. As wheel carriages were employed, it must have required dexterity in drivers to pilot their cattle and vehicles through the spaces between the stepping stones.

The most perfect of all the public buildings laid bare is the amphitheatre, which is situated so far apart from the other excavations that we cross a field to reach it. The field lies above the still unexplored portions of the city, and it is here that those excavations are being actively carried out, of which notice has lately been taken by the press—a number of men digging out the earth, which was carried away by women and girls in baskets, and deposited in trucks. These were run off in the usual manner, and emptied at a distance, forming a railway embankment in the direction of Vesuvius. By this improved process of removal, the excavations may be expected to go on rapidly. It is to be regretted, however, that the embankment crosses over the space which remains to be cleared out, and will have in turn to be removed. The hands of the girls engaged in this toilsome labor were, according to custom, held out for donations; and they would not have been indisposed to loiter at their work, but for the jealous watchfulness of a task-master who was armed with a light whip to keep them in order. It would have been a hard heart that did not feel for them. The weather was intensely hot, and the fatigue of lifting and carrying big baskets full of earth from the deep excavations, was apparently almost too much for those poor creatures to endure.

We spent altogether about six hours in our ramble over Pompeii; and having concluded by dining at the Hotel Diomede (a house of entertainment for tourists, a short way from the railroad station), we got pleasantly back to Naples by one of the evening trains.

ENGLISH POSTAGE-STAMPS.—The manufacture of postage-stamps in England costs £27,000 a year, and the produce sells for £2,700,000.

A MIXTURE of black lead and lard is a good anti-friction compound for carriage axles.

A Race between Steam and Electricity.

Old Wash. S—— is known by almost every railroad engineer, at least by reputation. A better engineer I never knew. But Wash. had one failing—he would drink; and if he was particularly elated with any good fortune, he was sure to get full of whisky; and though in that state never known to transgress the rules of the road by running on another train's time, still he showed the spirit which controlled him by running at a terrible rate of speed. At one time the company purchased a couple of engines for the E—— road, on which Wash. was running. These engines were very large, and were intended to be very fast, being put up on seven-feet wheels. From the circumstance of their being planked between the spokes of their "drivers," that is, having a piece of plank set in between the spokes, the "boys" used to call them the "plank-roads." They were tried, and though generally considered capable of making "fast time" under favorable circumstances, they didn't suit that road; so they were condemned to the "gravel-pit," until they could receive an overhauling, and be "cut down" a foot or two. Wash. had always considered that these engines were much abused, and had never received fair treatment; so he obtained permission of the superintendent to take one of them into the shop and repair it. At it he went, giving the engine a thorough overhauling, fixing her valves for the express purpose of running fast, and making many alterations in minor portions of her machinery. At last he had the job completed, and took her out on the road. After running one or two trips on freight trains to smooth her brasses, and try her working, he was "chalked" for the fastest train on the road, the B—— express. The "boys" on the road were anxious for the result, for it was expected that "Old Wash." and the "plank-roader" would "astonish the natives," that trip. Wash. imbibed rather freely, and was somewhat under the influence of liquor when the leaving time of his train came, though not enough to be noticed; but as minute after minute passed, and the train with which it connected did not make its appearance, Wash., who kept drinking all the time, grew tighter and tighter, till at last, when it did come in, an hour and a half "behind time," Wash. was pretty comfortably drunk; so much so that some of the men who had to go on the train with him looked rather "skeery," for they knew that they might expect to be "towed" as fast as the engine could run. How fast that was no one knew, but her seven-feet wheels promised a near approach to flying.

At last they started, and I freely confess that I never took as fast a ride in my life. (Wash. had got me to fire for him.) Keeping time was out of the question as far as I was concerned, for I had my hands full to keep the "fire-box" full and hold my hat on. We had not run more than ten miles, before the brakemen, ordered by the conductor, put on the brakes, impeding our speed somewhat, but not stopping us, for we were on a heavy down grade, and Wash. had her "wide open," and working steam at full stroke. At last the conductor came over and begged Wash. not to run so fast, for the passengers were half scared out of their senses. Wash. simply pointed to the directions to use all "due exertion" to make up time, and never shut off a bit. So on we flew to B——, 40 miles from where we started, and the first stopping place for the train. Here the conductor came to Wash. again and told him if he did not run slower, the passengers were going to leave. Wash. said "Let them leave," and gave no promises. Some of them did leave, so also did one of the brakemen, and the baggage-man; away we went without them to O——, where a message from head-quarters was awaiting us, telling them to take Wash. from the engine and put another man on in his place. I told him of the message, and picking up his coat, he got off and staggered to a bench on the stoop of the depot, where he laid down, seemingly to sleep. I started back to the engine, but Wash. called after me, and asked me "how we got the orders to take him off?" I told him "by telegraph." "Humph," said he, rolling over, "wish I known that: the confounded dispatch never should have passed me!"—*Trips in the Life of a Locomotive Engineer.*

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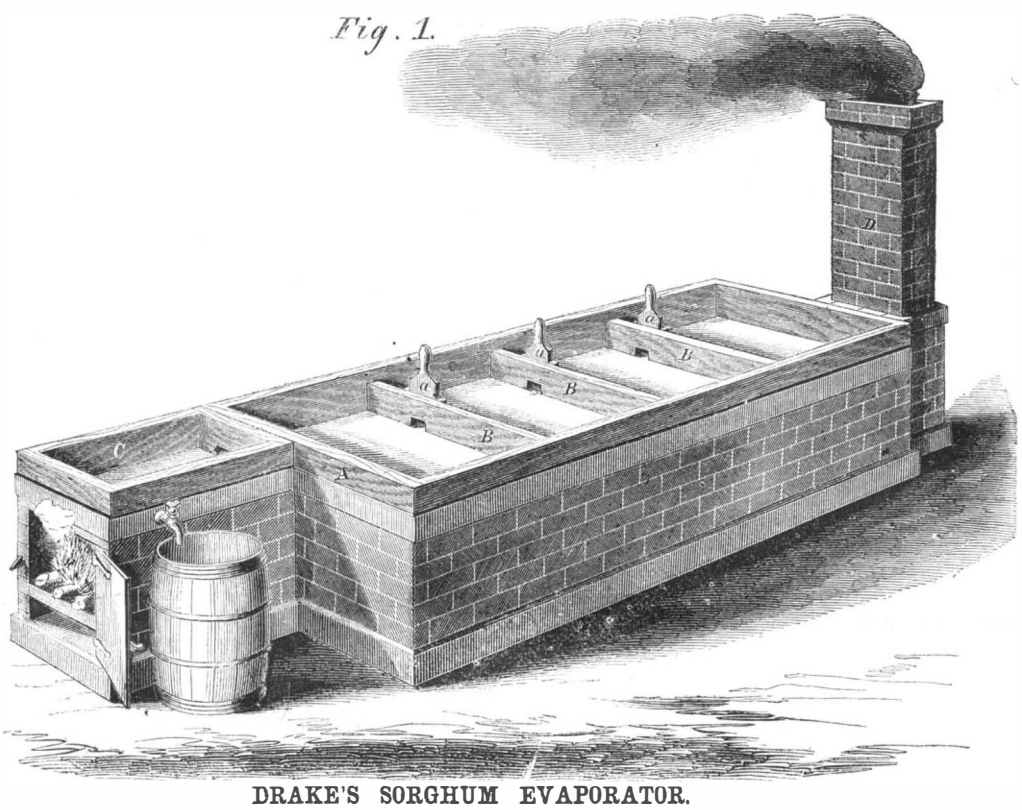
Improved Sorghum Evaporator.

The importance of the Northern sugar interest is increasing astonishingly ; it is but a very few years since the introduction of the Chinese cane, but as time developes its good qualities, it is being cultivated most extensively in the West. Inventors are turning their attention to machinery for economizing the manufacture of sugar from the juice of the sorghum, and we shall soon have a complete apparatus to make it with profit to the grower and a vast saving to the consumer. Our engraving represents a new evaporator for boiling the juice. Fig. 1 is a perspective view of the evaporator and its attachments —furnace, &c.—in full blast. The pan, A, is subdivided into four smaller pans by the divisions, B, which are furnished with gates, *a*, to shut off communication between them if necessary. The finishing pan, C, is immediately over the furnace, and is provided with a faucet, by which the sugared juice can be drawn off when it has reached the desired hight of granulation. Fig. 2 shows a section of the furnace grate and the flues, *b*, or passage-ways, for the smoke and flame on their way to the chimney, D. These details comprise the main features of the invention.

Fig. 1.

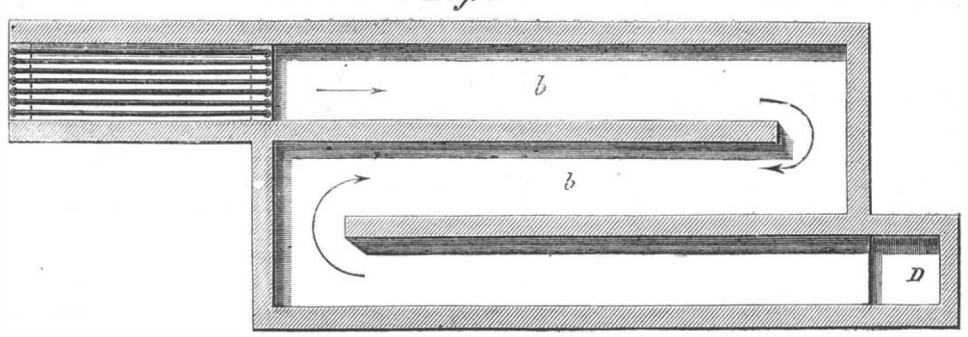


DRAKE'S SORGHUM EVAPORATOR.

The advantages arising from the use of this evaporator will be apparent upon an examination of the same. By allowing a large surface to the pan, the heat is utilized and exhausted of all its virtue before reaching the chimney ; and by having a long furnace cord-wood or any other wood can be burned without increasing the expense for cutting it up. The evaporator can be cheaply constructed, as the frame and the divisions are made of wood, and by the action of the fire and the position of the pans relatively to the same, the quality of the sirup or sugar produced is much improved. This evaporator has been tested fully. Sixteen hundred gallons of sirup were made by one of them, last fall, and the manufacture gave great satisfaction to all.

The patent for this invention was obtained through the Scientific American Patent Agency, Jan. 6, 1863, and further information respecting it can be obtained by addressing the inventor, F. D. Drake, Four Corners, Huron county, Ohio.

Fig. 2



Boiler Explosion Verdict.

The U. S. steam transport *Tillie*, on the 11th inst., on its way to Port Royal, S. C., exploded her boilers when near Sandy Hook, by which unfortunate casualty two engineers, one fireman and one coal-heaver lost their lives. The boiler of this steamer was new and had been constructed at the Delamater Iron-works, this city. In the evidence given before the coroner's jury in this case, the captain stated that the boiler had been examined by Inspector Lighthull, and a certificate was given that it could carry 45 lbs. pressure of steam safely, but it had never been submitted to the well-known hydraulic test, although Mr. Renwick had been solicited to make the test. The chief-engineer, Thomas Hawkey, stated that there was a pressure of 37 lbs. of steam on the boiler when he left it, about ten minutes before the explosion occurred, and his order was not to raise the pressure above 40 lbs. He also stated that the explosion was occasioned by the collapse of one of the arches over the furnace, but he could assign no reason why this should have been crushed, as the boiler was made of the best iron, and he would have considered it safe with a pressure of 50 lbs. There was plenty of water in the boiler according to the gage-cocks. On the 13th inst. the coroner's jury gave a verdict to the effect that they could not account for the explosion as the boiler was made of the very best materials. As usual, "nobody was to blame." And yet it appears to be a perfectly logical deduction, that if the explosion was occasioned by a collapse of the arch above the furnace, according to the testimony of the chief-engineer of the boat, then the arch was nor sufficiently strong to safely withstand a pressure of 40 lbs. of steam. The hydraulic test for steam boilers should uever be omitted by inspectors, and it should be applied both with gradually and also with rapidly increased pressure, as it reveals defects that cannot by any means be detected by mere ocular inspection. The coroner's jury took a most contracted view of this case and all the attendant circumstances, or a different verdict would have been rendered. What is the use of inspectors of boilers if they do not perform their duty ?

Repudiation of "Shinplasters."—The Revenue Stamps.

The fractional parts of a dollar issued by cities, corporations, banks or individuals, as shinplasters, we are glad to know, are being generally refused by tradesmen and other business people throughout the country. *Thompson's Bank-note Reporter*, of the 16th inst., states as follows :—

Shinplasters of all kinds are now rejected as currency, and the Postage (U. S.) Currency is exclusively used. Most of the local shinplasters are selling, in round amounts, at 5 @ 10 ℔ cent discount. We, however, find it necessary to decline purchasing any.

Revenue Stamps have undergone a change. Any stamp is now good for its face on any instrument, care being had to affix the sufficient amount of stamp or stamps required by the law. This does away with a vast amount of trouble, and enables dealers to keep an assortment on a reasonable amount of money invested in them. Orders for stamps can now be sent to us, naming only the sizes wanted. All orders for $100 and over of stamps will be filled, adding 4 ℔ cent ($104 in stamps for $100 in money).

Hereafter shinplasters of every denomination issued by cities, corporations or banks, will not be received at the office of the Scientific American. Persons who have occasion to send us fractional parts of a dollar may remit U. S. Postal Currency or postage stamps or revenue stamps of any denomination instead.

Minerals of New Brunswick.

The North-eastern British provinces of America contain natural resources, which, if properly developed and applied, would make them the greatest commercial and manufacturing commonwealths on the Atlantic sea-board. Thus coal and iron are the two grand minerals for manufacturing and for driving machinery, and these minerals are found in abundance, both in New Brunswick and Nova Scotia. At present we will only refer to New Brunswick, which has the elements of incalculable wealth stored up within its bosom. The carboniferous system of rocks covers an area equal to more than one-third of the entire province.

In Albert county, a rich carboniferous mineral—called by some coal, and by others asphalt—exists in great abundance. It surpasses all other minerals on our continent in the production of kerosene, and about 15,000 tuns per annum have been mined during the past three years. A seam of rich cannel coal has also been found in the same county.

Iron ore exists in considerable quantities near Woodstock, and smelting works on an extensive scale were at one time in operation there, very fine iron being produced. The bed of ore is in three separate seams, of 28, 15 and 17 feet respectively. Iron ore has also been found in considerable quantities, some distance below Fredericton. Its thickness is described as varying from 20 to 60 yards. One great reason why the iron of New Brunswick is not worked more extensively is accounted for by the fact that coal has not been found in the vicinity of the ore, and the cost of its conveyance thither so increases the price of the melted iron as to prevent it finding a ready sale. This is an obstacle, however, will yet be overcome by railways. Gypsum, copper, lead, potter's clay, fire clay, &c., are also found in large quantities.

Harbor Defenses.—A correspondent, Mr. Charles E. Toop, suggests that our harbors may be protected from invasion by stretching strong chains, to which torpedoes are affixed, across the narrowest portion of entrances. The chains are to be drawn taut so soon as the enemy appears by means of windlasses to which power is applied, and the torpedoes are to be fired in any way that is deemed the most practicable.

We are happy to be able to state that a portion of the United States Patent Office, which was used for a long time as a military hospital, has recently been vacated and the patients transferred to more suitable structures for sick soldiers.

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The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY
At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH

TERMS—Three Dollars per annum—One Dollar in advance, for our months.
Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
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VOL. VIII, NO. 5....[NEW SERIES.]....*Nineteenth Year.*

NEW YORK, SATURDAY, JANUARY 31, 1863.

PROGRESS OF MODERN MANUFACTURES.

M. Michel Chevalier, the distinguished French political economist, has published an interesting disquisition on the progress of the manufacturing system, forming an introduction to the "French Juror's Report" on the International Exhibition in London last year. He considers that international exhibitions of industry promise to become permanent institutions, exercising a vast influence for good by enabling nations to take reckonings of their manufacturing progress. From a comparison of the results of the previous exhibitions of England and France, M. Chevalier concludes that the producing powers of mankind are continually on the increase. What is meant by manufacturing power is the work that one man can perform in a given time. This result is attributed to improvements and the more extended use of machinery driven by water and steam power. In the manufacture of iron the productive powers has increased thirty-fold in six centuries. Thus, if a man could manufacture one tun per day six hundred years ago, he can now produce at the rate of thirty tuns.

In the production of cotton yarn, dating from 1769, when Arkwright took out his first patent, one man can now spin 400 times more yarn than the best spinner of that period. In grinding grain and making flour one man can do 150 times more work then he could perform one century ago; and in the manufacture of lace one woman can produce as much work in a day as one hundred women could execute a hundred years ago. In the refining of sugar, the whole of the operations last only as many days as it required months about thirty years since. The manufacture of looking-glasses with an amalgam of mercury and tin, once occupied six weeks in fixing the amalgam on a large glass; the present process occupies only forty minutes. The engines of a first-class iron-clad frigate perform as much work in twenty-four hours as 42,000 horses.

In the production of large steel forgings there has been great progress made. In the Exhibition of 1851 Krupp exhibited a small steel cannon; to the French Exhibition of 1855 he sent a steel ingot that weighed five and a half tuns; while to the one held last year in London he sent a crank axle that weighed no less than twenty tuns. In all branches of the mechanic arts M. Chevalier confesses to the progress made in the productive power of man by the aid of improved mechanism. Such improvements are chiefly due to ingenious inventors and enterprising manufacturers.

FRICTIONAL GEARING.

We have had a number of applications lately from persons who desired to make use of frictional wheels as a means of transmitting power. Wheels of this character have not been very generally employed in this country; the only instance where they are used, that we can call to mind at present, is upon the shafts of blowers, made in Philadelphia, for creating an artificial draft. Some solitary cases are familiar to us, but our experience and knowledge of their capacity is limited. We once saw a long line of shafting, in the Eastern States, driven by a pair of beveled frictional gears. They were made of hard wood. We also remember that there was a brick machine which had these frictional gears in use, driving a kneading cylinder. There seems to be no good reason why they should not be generally employed, and we hope to see them experimented upon and introduced. The objections to toothed wheels are many; if these smooth-faced gears can do the work which it is claimed for them, they will certainly inaugurate a new era in imparting power and motion. The philosophical principles embraced in the peculiar action of metal or wooden bodies in rolling contact with each other are here appended. First: The friction is in proportion to the pressure; it is independent of the velocity or the diameter of the cylinder. Second: It is greater when the substances are the same, than when they are of different natures. Third: It is not diminished by slight coatings of grease, but is impaired by the polish of the surfaces. The second principle may perhaps be rendered more intelligible by saying that the metals which have the greatest affinity or attraction for each other are obviously the most suitable for the purpose in question. Wheels intended to run together should be cast from the same pouring, so that their natures may be alike as near as possible. Friction may be defined as the interlacing of the fibers of substances in contact with each other; and in proportion as these fibers are reduced, are smoothed off by attrition or any other means, the friction is lessened. It is not necessary that friction wheels should be made roughly; but it is requisite that any approach to burnishing should be avoided, as by this process the minute particles or atoms of matter, upon which the wheels depend for their action are glazed over, and the adhesion or friction consequently reduced. If we examine surfaces which have been in rolling contact with other surfaces, we shall find a peculiar appearance and feeling upon them; as for example a T-rail, or the wheel which runs upon it. This appearance is the result of the work done by it, and a microscopic examination would reveal a series of minute points and laminæ in the iron upon which the wheels depend for their adhesion or bite. We shall be glad to record any progress in the manufacture and employment of frictional gearing.

THE PREPARATION OF FOOD.

It has been asserted by politico-domestic writers that the foundations of society rest upon the human stomach. We do not suppose that these essayists mean to declare literally that the whole social structure rests like a night-mare upon the gastric regions, but merely to convey the idea that our mental tranquillity and harmony depends in a great measure upon the proper fulfillment of the digestive functions. Food improperly prepared causes the greatest uneasiness to the stomach; this organ either rejects it utterly or else is so enfeebled by the effort to overcome the evil tendencies superinduced by it as to lose much of its natural vigor. So important is the influence of the stomach upon the brain and its moral workings, that the great occurrences of modern times are said to have been originated by various diseases. Thus, if Napoleon declared war against combined Europe, it was not so much induced by love of conquest as by a fit of spleen engendered by dyspepsia. Or, if through some apparently inexplicable reason, solemn treaties and compacts have been violated and set at naught by nations, the primary cause may be found in a truffle or a *paté de foi gras*, which disagreed with the imperial stomach, and so made royalty utterly blind and oblivious to all its moral obligations. These are fine-spun and far-fetched theories unquestionably, and are only valuable as showing the results which might arise from violating the natural laws of the human body. Let us, then, have our food prepared in such a manner that it will be both wholesome to the body and pleasing to the palate.

This must not be interpreted into a license to make a god of the belly, by any means. Food to be wholesome must be palatable, and this latter point is only gained when tested by the popular standard in such cases—the taste. It is an old and a trite saying that "what is one man's meat is another man's poison," and this is true in a literal sense. The outdoor worker, whose indigestion is unimpaired, can assimilate food that is in reality rank poison to a person of more sedentary habits. The proverb is also true in another sense, and this one is more particularly applicable to our quotation, and that is, that from the want of sympathy with the nourishment which any individual takes into his stomach, the sustenance revolts against the latter and creates distress, utterly nullifying the object for which it was designed. What we desire therefore, to impress upon our readers is to see that their meals are properly prepared before they are eaten. The office of nourishment is a divine one, renewing those wondrous organizations, the heart, the brain and the whole physical system. To feed the body is to sustain it, and to sustain it is to perpetuate all the usefulness and all the glory which its combined functions are capable of conferring upon the world. If we recognize this view of the case we must see in the humblest vegetable or in a pound of animal fiber that is to be cooked, a weight which, if it be thrown into the right scale, will exert a vast influence upon society. Let us then be discriminating in the quantity as well as the quality of the sustenance we consume. This does not imply daintiness, although, if there is any one condition of life in which fastidiousness is excusable, it is certainly in selecting and rejecting that aliment which the palate or nostril forewarns us is unwholesome.

Americans have long been called a nation of dyspeptics, and not unreasonably. Our energetic way of getting a living or amassing wealth leaves little leisure for the cultivation of those social amenities which not only adorn life but are actually necessary to a healthy enjoyment of it. The laughter and chat at table after dinner exert their influence most beneficially upon the digestion, and the mild and soothing influence and quiet modulation of the voice at the tea-table are a fitting exposition of the state of mind demanded at that time alike by the body and all its organs, mental and physical. If therefore, we are dyspeptics it is as much due to the absence of good cooks as to other causes; for who can laugh when a weight presses upon his stomach which makes life a burden? or who can be tranquil when his last meal urges him to frenzy, almost? There are a great many persons, who taking a superficial view of the subject would be disposed to deny our point *in toto*. It should be borne in mind however that long before our day gifted men of all sciences and professions have deemed it no small distinction to confer upon the world any details, relating to the absorption of nourishment by the body, which they may have developed during their researches. So also cooks abroad (who, by the way, are recognized as artists when they have attained great celebrity) have received decorations and honors from royalty almost without stint. Here, however, with us, the case is different; we might quote yet another saying bearing upon this subject, which is that "heaven sends meats but the devil sends cooks." It is only necessary to bear in mind, both when cooking and eating, that the human stomach is an extremely valuable and delicate organ, and he who offends it not only inflicts present discomfort, but also a lasting injury to his constitution.

THE IRON-CLAD STEAM BATTERY, "ROANOKE."

As we possess facilities for gaining access to the iron-clads now building, we availed ourselves of them recently to inspect the progress of the work going forward on the *Roanoke*. We betray no confidence when we publish the following particulars:—The *Roanoke* is at present entirely covered from stem to stern with a canvas awning, so that the men employed are sheltered from the weather. There are to be three turrets, which are being put in position as fast as possible; two of them (one forward and the other amidships) have their first courses well on. The deck plates are all laid, they are three-fourths of an inch thick, placed one upon the other, so as to break joint where the edges meet. The joints come very neatly together, a small space being purposely left for expansion and the natural working of the ship; the plates are secured by counter-sunk bolts to the deck beneath. The armor plates are all on, and a very intelligent workman assured us that he would soon have the outside of the *Roanoke* completed. The boiler makers are busy in putting up the smoke-pipe breeching on the steam chimney of the boilers, one being common to all. There will be a heavy grating over the hatch which surrounds the smoke pipe where it issues from the deck, made of

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wrought iron, one inch thick by seven inches deep; projectiles striking this would glance off without injury to the ship; were it not for this protection they might damage the boilers.

Below deck we see on every side evidences of the immense strength of the hull, so far as heavy timbers go. Affixed to the ceiling of the main deck are circles of oak timber nearly twelve inches square; these are supported at regular intervals by stanchions of the same dimensions. These circles strengthen that part of the main deck over which the turrets are placed. Each turret shaft sets in an immense cast-iron step, provided with a wrought-iron key and a composition seat for the same on its lower surface; from the top of this step run two strong braces to the lower part of the turret shell. When the key is driven, the ways on which the turret revolves are relieved of a portion of the superincumbent weight. The engines which move the turret are directly underneath it; they are double, oscillating, and have a bore of 16 inches in their cylinders, and a stroke of 22 inches on the piston. The main engines are of the trunk pattern, with cylinders of 80 inches diameter, and about 36 or 42 inches stroke of the pistons; the trunks are, as near as we can guess, about 36 inches in diameter. There are four Martin's boilers, also a large donkey boiler for driving the auxiliary engines while the main boilers are out of service. There are four blowing engines which ventilate the vessel thoroughly, conduits being laid through the vessel, which are tapped at intervals with branches leading to the state rooms; in the latter are registers by which the inmates can at all times purify the air.

On every side we see evidences of strength and the best powers of resistance that can be afforded by the thickness of the armor which is employed. Although the *Roanoke* has the Ericcson revolving turret, her hull is the same as that of any sea-going vessel, with the exception of the armor. There are no guards to the vessel, and seas which may strike her can wash over without injury, except in extraordinary cases. That portion of the rudder-post which is usually exposed in vessels is covered in the *Roanoke* by a strong wrought-iron hood, which also protects the screw from injury by shot. At the time of our visit an officer from one of the English gunboats called at the Novelty Works and requested permission to visit the battery; he was very politely accorded an opportunity to view the same outwardly, but was denied admission. These particulars do not relate to any vital points in the *Roanoke* which could result in embarrassment to the Government in future; they contain no information which would be of the slightest advantage to our enemies.

LANCASHIRE---ITS POPULATION AND MANUFACTURES.

Many persons have expressed a desire to know something more about the people of Lancashire (England), whose distress has excited such general sympathy. The inquiry has been made, why they alone of the population in England should now be afflicted with so much poverty. We will endeavor to throw some light upon this subject. Lancashire may be said to be the great seat of the cotton manufacture, not only of England but the world, and Manchester is the "cotton metropolis." The development of the cotton manufacture is one of the wonders of modern industry and this is chiefly due to the mechanical genius, enterprise and industry of the people of Lancashire. The spinning-jenny, the throstle and mule spinning machines were invented there, and so was the power loom.

Two centuries ago, Lancashire compared with the other parts of England, was a barren and poor country and its population was sparse. At the beginning of the American Revolution the whole British trade in cotton was valued at $3,000,000, and only about 20,000 persons were engaged in it. In 1860 the value of the English cotton manufactures exceeded $350,000,000 and about 5,000,000 persons were engaged in the business. These statistics will afford some idea of the rise and extent of the cotton manufacture in England. About 1760, several of the Lancashire towns and hamlets, such as Manchester, Oldham, Blackburn, &c., contained a primitive, semi-manufacturing and rural population. Manufactories were then unknown; the cotton was picked, carded, spun on small wheels and woven in hand-looms in the cottages of the people. Seven years afterward (1767) James Hargreaves invented the spinning-jenny, by which several spindles could be operated by one person; and subsequently Richard Arkwright invented the throstle or roller-drawing frame. These inventions gave Lancashire its first great impulse in the manufacture of cotton. In 1779, Samuel Crompton invented the mule-spinning frame—a cross between the jenny and throstle frames—which was a very great improvement in the production of fine yarns, and this gave another great impulse to the cotton trade. But up to 1785 the whole of the cotton cloth was woven by hand. In that year the Rev. E. Cartwright invented the power loom, which completed the main series of improvements which have so wonderfully developed the cotton trade, and from that day forward Lancashire sped onward upon the wings of manufacturing greatness. Hand-power and horse-power were still the only agencies in operating cotton machinery. The next great step in the way of improvement was yoking these machines to the power of falling water and driving them by wheels. This was first most perfectly effected by Robert Owen (father of the Hon. Robert Dale Owen, of Indiana,) at the New Lanark Mills on the river Clyde, in Scotland. The character of the cotton manufacture then assumed an entirely new phase by the erection of large factories and the congregating of operatives into them under the employment of large capitalists, thus abolishing the independent cottage system. The falls of water on the rivers Irwell and Mersey gave to Lancashire and especially Manchester, great advantages for cheap power in driving machinery, and that city became like a whirlpool sweeping almost the entire cotton manufacture into its vortex. It is a city chiefly composed of an agglomeration of cotton manufactories, and is also the center of several large manufacturing districts. In 1800, the population of Lancashire was 672,500; its population is now 2,800,000—three-fifths of which are engaged in the cotton manufacture. In 1800, only 6,000,000 pounds of cotton were imported into Great Britain; in 1860, no less than 1,390,938,752 pounds, and of this large quantity it is alleged that eighty-five per cent was obtained from America. This supply having been cut off for nearly two years explains the cause of so much suffering in Lancashire. From the most recent accounts we learn that out of 2,000,000 persons there were 431,395 persons dependent upon charity for their daily food, fuel and clothing.

The average wages of men in English cotton factories is eighteen shillings and sixpence weekly—about four dollars and a half—that of women ten shillings and twopence; boys seven shillings. With such low wages they cannot save much against sickness, old age or want of employment, and their general habits of life are not favorable to economy. The English cotton operatives are dependant upon their daily toil for wages, and when there is no work for them, of course starvation soon follows unless outside relief is afforded.

SANITARY CONDITION OF NEW YORK.

The annual report of D. E. Delevan, City Inspector, for 1862, just published, throws much light upon the condition of the city as it regards health, the condition of the poor population, the effects of drainage, living in cellars, &c.

Health.—It has been frequently asserted at meetings of sanitary associations that New York was a very unhealthy city as compared with most others in America and Europe. Mr. Delevan flatly contradicts such assertions. As compared with London, it is more healthy, according to the following tables:—

DEATHS IN LONDON TO EACH MILLION OF POPULATION.

Deaths.	To the Million.
1858—64,093	23,102 1-11
1859—62,616	22,569 2-3
1860—63,100	22,744 1-6

NEW YORK CITY—POPULATION ONE MILLION.

	Deaths to the Million.
1860	22,716
1861	22,117
1862	21,244

The mortality of Paris is greater than that of London.

Underground Cellars.—There are six thousand families in the city, who live in underground cellars, and they number about 18,000 persons. In many cases the tides flow into these dwellings and they are the abodes of wretchedness and fevers. Attention is directed to an act of Parliament which prohibits the use of cellars for dwellings in London, and a similar enactment is suggested for New York.

Tenement Houses.—In many tenement houses there are from forty to eighty families in each. Of course such cases are few in number, but in some of the wards the over-crowding of dwellings is notorious. In all such cases uncleanness is the rule, life is short and the mortality great.

Sewerage.—The benefits of drainage in cities are clearly set forth. It has been ascertained, that in those streets which have been furnished with sewers, after the buildings had been erected in them, the mortality has been reduced about one-half, and the health of the people correspondingly improved. The same results have been experienced in all other cities.

Streets and Street Manure.—The political management of New York City is one of the greatest blots upon a Government springing from the people. Under a partizan contract, the streets are permitted to smoke with filth, while a very large sum is paid annually to keep them clean. In European cities, the street manure sold to farmers pays for the expense of keeping the streets clean; in New York this manure is a perquisite to the contractor, who annually receives $279,000 besides.

Miscellaneous.—It is recommended that the cobble-stone pavements in all the streets be substituted with the small trap block pavement. The former is a constant expense for repairs, and it is more difficult to keep clean than the latter. Within a short period great improvements have been made in some parts of the city by the erection of more commodious tenement buildings for the laboring classes. Complaint is made regarding the allowance of slaughter-houses in the inhabited parts of the city, and the French system of *abattoirs* is recommended as a substitute. It would certainly be a great improvement to locate all the slaughter-houses in some district removed from the dwellings of the people.

New York is so favorably situated, that it could be rendered the most cleanly and the most healthy city on the globe. It surface is favorable for perfect drainage, its shores are washed twice every day by the tides of the sea, so as to carry off all offensive sewerage, and the sea-breeze fans its streets daily with life-giving freshness. For the gratifying condition of the public health the political rulers of the city deserve no credit.

A LARGE SCREW PROPELLER.

The Novelty Iron Works are finishing a large propeller for the engines of the frigates building for the Italian Government. The propeller in question is 19 feet in diameter, and has 31 feet 6 inches pitch. The diameter of the hub, at the largest end, is 41 inches; and the length of the hub, 4 feet 1½ inch. The diameter of the two bearings, one on each end, (it being Griffith's patent), is, on the forward end, 22 inches, and upon the after end, 16 inches. The greatest width of blade is 6 feet and 3 inches, and the total weight of metal (brass) melted for the propeller was 30,000 pounds. Its finished weight will be something less than this figure.

Wages.—Wages are higher at the present time, in the several trades, than they have been for a long time previous. This is owing to the scarcity of help and also to the increased cost of all kinds of food, fuel, light, &c. We have taken some pains to ascertain the rates paid to members of the several trades. Good machinists are paid for general floor and vise work, from $1 50 to $1 75 per day of ten hours. Lathe hands receive from $1 75 to $2 per day. Moulders receive about the same rates. Carpenters about the same. Blacksmiths receive from $1 75 to $2 25 for ten hours work. Coppersmiths from $1 50 to $2. Ship carpenters from $2 to $3. Laborers get about $1 per day on an average.

Shaker Hoods.—The manufacture of "shaker hoods" is an important part of the business of Barre, Mass., in which two hundred and fifty girls are engaged. One million of palm leaves, of which they are made, are split every year, and are woven by families within a radius of twenty miles, hundreds of these families making a good living by this branch of labor. The amount produced annually is $150,000 worth, and the manufacturers' tax for three months past amounted to a fraction over $1,400.

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VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents :—The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models —Designs—Caveats — Trade Marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Reissues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees ; also a variety of miscellaneous items on patent law questions. It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the Patent Law and Practice, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of seventeen years, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of 6 cents in postage stamps. Address MUNN & CO.,

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No. 37 Park Row, New York.

Appointments and Promotions in the Patent Office.

To be *Examiners*—salary $2,500 per annum :—Dr. J. W. Jayne, of Pennsylvania ; Ex-Gov. Wm. Bebb, of Tennessee ; J. M. Blanchard, of Indiana ; Prof. B. S. Hedrick, of North Carolina ; J. H. Adams, of Massachusetts ; Dr. Wm. C. Doane, of New York.

To be *First Assistant Examiners*—salary $1,800 :—Newton Crawford, of Tennessee ; W. T. Dennis, of Indiana ; E. Quinn, of New Jersey ; T. C. Connolly, of the District of Columbia ; Ex-Gov. L. J. Farwell, of Wisconsin.

To be *Second Assistant Examiner*—salary $1,600 :—Charles Rogers, of New York.

We are much gratified to be able to testify that all of the above gentlemen are abundantly qualified for the important duties assigned to them. Indeed it may be said of the appointees of the Patent Office generally, that they are men of high character, good habits, liberality of judgment, intelligence and ability. The decisions of the Office are much more uniform than they used to be, and are, for the most part, liberal and satisfactory. Little of the old leaven of narrow-mindedness toward inventors remains ; most of the few wrong and incongruous decisions may be traced to that source. Such decisions are however generally corrected by appeals to the Board of Examiners-in-chief. The Patent Office Department, take it altogether, is in a flourishing condition, and enjoys the public confidence to a degree that it never before experienced. This is undoubtedly due to the generous spirit of encouragement which so many of the officials, from the Commissioner down, are ready to extend to patentees and inventors.

The Rebel Rams of no Value.

A correspondent of the Philadelphia *Inquirer*, writing from the Savannah river, speaks of some of the rebel rams as follows :—"The rebel ram *Georgia* is useless as a moving vessel, her engines being in so crippled a condition that, with the appliances they have, she cannot be repaired. From present appearances she is hard and fast aground, as she does not swing with the tide. Her armament consists of five guns on each broadside, and one at each end. The rebels acknowledge that she can be used only as a floating battery, auxiliary to Fort Jackson, and not as a ram. The *Fingal* is a failure, and, like the *Georgia*, is turned about when they desire to shift her position. The *Georgia* now lies off St. Augustine creek, having a full crew on board, who, like Micawber, are 'waiting for something to turn up.' The rebels have been strengthening their batteries of late, and from appearances, one or two masked batteries have been built."

MISCELLANEOUS SUMMARY.

HOOFS AND HORNS.—Mr. Cox, of Ohio, has recently offered a resolution in the House of Representatives, asking the Secretary of War what amount of revenue is derived from the hides, hoofs and tallow of the cattle slain for the army since the commencement of the rebellion, the number of cattle slaughtered, to whom sold, whether by contract, and whether an arrangement cannot be made to increase the revenue from that source. Mr. Cox lectured in this city recently, and many loyal citizens are of the opinion that he exhibited his own hoofs and horns on the occasion.

ICE.—Get in a full supply as soon as sufficiently thick and solid. In the better preservation of food in hot weather, and in case of sickness alone, it may be worth its full cost, to say nothing of the luxury of having at hand a supply of "pickled coolness" in midsummer weather. Ice is not difficult to keep. A rough shed about 12 feet square and ten or twelve feet high, well roofed and out of the sun, with enough of clean saw-dust to fill in five or six inches thick between the ice and the boards, and also to cover it well, will preserve enough ice for a season's supply for an ordinary family.

DIPTHERIA.—A gentleman who has administered the following remedy for diptheria, says that it has always proved effectual in affording speedy relief. Take a common tobacco-pipe, place a live coal within the bowl, drop a little tar upon the coal, and let the patient draw smoke into the mouth, and discharge it through the nostrils. The remedy is safe and simple, and should be tried whenever occasion may require. Many valuable lives may be saved, the informant confidently believes, by prompt treatment as above.

HUNDREDS of pack-saddles are being manufactured in Cincinnati. Pack mules were first introduced last winter into our army in Western Virginia, after it was discovered to be impossible to carry supplies in wagons over mud roads in the winter season. It is now intended to supply the forces in Southern Kentucky in the same way.

A VERY large sugar refinery is now being erected in San Francisco. It is 140 feet front, 7 stories high, and the superficial area of its floors measures 77,000 square feet. In addition, the boiler-house is 50 by 50 feet, and the charcoal retort-house 100 by 50 feet. The machinery for it is being put up, and operations will be commenced in it in March next.

ON DIT.—The French Government has decided not to proceed with any more iron frigates, as recent experiments, more especially with flat-headed shell—the missile of Mr. Whitworth having been employed with such startling effect against armor-plated targets—have, it is alleged, satisfied them that the artillerists are more than a match for the shipbuilders.

A PARTY of ladies were the other day discussing the question of draft, when a young lady inquired the reason why men were exempt who had lost but two or three teeth ? "Because they couldn't bite off the end of a cartridge." "Then," replied the questioner demurely, "why don't they soak 'em in their coffee ?"

THE "KEOKUK."—The iron-clad Whitney battery, *Keokuk*, is rapidly approaching completion ; her armor is all on, the turrets are about finished, and we are told that she will be ready for a trial trip in about a week.

A LETTER written on board the *Nahant* (iron-clad), after her arrival at New York from Boston, states that she is too heavy for a sea-boat, but that no inconvenience was experienced during her voyage, because no rough weather was encountered.

A Steam Boiler Explosion Trial.

On page 56, present volume of the SCIENTIFIC AMERICAN, we alluded to a trial then in progress at Bridgeport, Conn., on the part of Wheeler Beers, of Bridgeport, against the Woodruff & Beach Machine Company, of Hartford, for damages resulting to the establishment of the former from the explosion of a steam boiler made for him by the above-mentioned company. We have since learned that the jury awarded a verdict in favor of Mr. Beers for the amount of $4,421 25.

A Nice City to Live in.

The London *Daily News* says that the garotte panic is very wide-spread in that great city, and is driving the citizens to very ridiculous measures for protection. Revolvers and bowie-knives are simple weapons compared with the dangerous arms which some self-defenders carry. Elaborate knuckle-dusters have been made to order, spiked all over the knuckles, and containing one short sharp stiletto protruding from the inside. Bludgeons that shoot out bayonets, and sticks that contain daggers and swords, are now sold more openly in the city streets than oranges or chestnuts. One belt at least has been seen, the buckle of which is loaded like a pistol, and which, when a string is pulled under the coat of the wearer, will shoot anybody in front of the stomach. Life-preservers and thick sticks are now more common than toothpicks, and spiked collars are now worn generally with patriotic pleasure. Meetings have been held and anti-garotte societies formed for mutual protection, and a bullet flying into a drawing-room, and bringing down the window cornice, has brought home the reality of civil war to the horrified house-holder. However, despite these precautions, garotte robberies seem to be on the increase, and all London, that is all moneyed London, is in turmoil and alarm. The garotting bands seem to be organized, and have thus far defied all the efforts of the police to break them up.

Massachusetts Manufactures.

The *Commercial Bulletin* (Boston) says :—

The Ames Manufacturing Company, of Chicopee, are working 250 hands now, on swords, cannons and gun machinery. Three cannon a day are made ; they are 24-pound howitzers of the Dahlgren pattern for gunboats. Their gun machinery is for gunmakers in England and at home.

The Lowell Carpet Company finds the market for their goods so encouraging that it has been decided to start more machinery. About one-half of the machinery has been at work, and now enough will be started to amount to three-quarters of the company's works.

Wilkinson & Cummings' new block in Springfield is nearly ready for occupancy. The entire building, four stories high, with a fine large basement, has been fitted up for the manufacture of saddlery, cavalry equipments, and leather work of all sorts. Benches have been put up, running through the entire building, in three of the stories, which will accommodate several hundred workmen. It will soon be one of the most complete saddlery establishments in the State. This firm have done a great business during the past years.

Aluminium Bronze.

We had occasion in our last issue, when speaking of aluminium, to refer to the various articles manufactured in this metal by Messrs. Reid & Sons, of Newcastle. This firm also use a metal designated aluminium bronze, and which may contain different per-centages of aluminium. It being found that a very small proportion of aluminium, added to copper, produces a compound metal of great hardness, one specimen we have seen, containing 90 per cent copper and 10 per cent aluminium, was so hard that the file hardly makes any impression, whatever, on it. Indeed, it would appear that there should be no difficulty in manufacturing engineering machinery and tools of this metal. A pair of scissors manufactured in this compound metal have, we understand, been found, to cut quite as well as scissors made of steel.—*London Artizan.*

Mr. Hobbs at the Polytechnic Association.

All of our readers will be pleased to have their attention called to the report, which we publish on another page, of the discussion at the Polytechnic Association. Mr. Hobbs, the famous lock expert, gave a clear and comprehensive statement of the principle of lock-making, followed by an entertaining narrative of his adventures in England, which made so much noise at the time. The events are not new, but this statement of them by Mr. Hobbs is both new and interesting.

MESSRS. ALDEN, FRINK & WESTON have purchased the interest of John Kerr & Co., in the Halcyon Knitting Mill of Cohoes, N. Y. The establishment has been recently much enlarged and improved.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Mold for Casting Shells.—This invention consists in the employment, for holding the core box, of a shouldered metal bush or sleeve applied in such manner as to support the core independently of the sand of which the mold is formed, and thereby prevent the displacement of the core in the mold and insure a uniform thickness of the shell in all parts. Andrew J. Eddy, of Brooklyn (E. D.), N. Y., is the inventor of this improvement.

Manufacturing Chenille.—The ordinary process of making chenille is by first weaving a web with the warp threads separated at intervals, next dividing the said web into strips by cutting the weft threads in the intervals of the warp and then twisting the said strips. That process is necessarily very slow owing to the unavoidable slowness of the weaving, and the object of this invention is to make a greater length of the fabric in a given time. This improved process of manufacture consists in taking what is called gimp, made by winding around two or more threads, placed side by side, the silk or other fibrous substance which is to form the weft or filling of the chenille, and passing the said gimp between the threads which are to form the warp or central core of the chenille, cutting the covering of the gimp in such a manner as to divide every coil, then drawing out the cords of the gimp and twisting the warp or core threads together. George Comings and Louis Mensing, of No. 50 White street, New York, are the inventors of this manufacturing process.

Machine for Cutting Files.—This invention consists in the employment of a cutter and hammer arranged to operate in connection with a bed on which the file blank is placed, in such a manner that all the parts will be operated by the turning of a wheel or crank, the blank being fed to the cutter and the cutter and hammer each actuated at the proper time to perform perfect work. The several parts are also so arranged that they may be thrown out of gear when necessary, in order to admit of the bed on which the blanks are placed being gigged back when one side of a file is cut, in order to cut another side or to commence operations on a new file. Seth Hoke, of Union City, Ind., is the inventor of this improvement.

Iron Vessels.—This invention consists in the construction of the hulls of vessels or fortifications of wrought and cast iron, by arranging two or more series of wrought-iron bars to cross each other, and uniting them by means of castings of suitable form produced by pouring the metal between the said bars, whereby is obtained at small cost a solid iron structure of great strength and impenetrability. B. T. Babbitt, of New York city, is the inventor of this improvement.

DISCOVERIES AND INVENTIONS ABROAD.

The following are some of the more useful of the foreign discoveries and inventions recently patented in Europe :—

Burning Limestone and Raising Steam.—A patent of rather a remarkable character has been taken out in England by W. Blackmore and H. Lamb. The nature of the invention consists in introducing common limestone into the furnaces of steam boilers with the fuel, by which process the lime is burned with the ordinary combustion, thus avoiding the employment of limekilns for burning stone lime. The inventors state that more steam is generated in a boiler with the same quantity of fuel mixed with limestone than in furnaces burning fuel exclusively. The limestone is first spread in lumps over the bars of the furnace and the fire is made thereon, then the fire is maintained by adding more fuel mixed with lumps of limestone.

Fastening Railway Chairs.—J. A. Ransom, of Ipswich, England, has patented a mode of fastening railway chairs with a combined iron spike and wooden tree-nail. The wooden tree-nails for this purpose are compressed, then drilled from the heads toward the points, but not entirely through them, to receive the metal spikes. These tree-nails derive greater holding power upon the chairs by the expansion of the metal after they have been driven in.

Protecting Skins and Furs from Vermin.—Dry skins, such as those of stuffed birds and animals, also furs, &c., are very subject to the attack of insects, by which they are soon destroyed. To prevent such injury to them P. W. Payras, of Paris, France, has taken out a patent for treating them with a mixed solution of the sulphate and chlorure of zinc, of a strength marking 15° of Beaume's hydrometer, to which ten grains of arsenic are added to one quart of the liquid. The liquid is applied with a brush or sponge to the fleshy side of the skin, which is thenhung up to dry. The presence of the arsenic may be dispensed with in moderately cold climates. The liquid is kept for use in a glass or porcelain vessel, but the most rapid mode of applying it is to dip the whole skin into the liquid, then hang it up to dry.

Protecting Iron Ships from Barnacles.—The perfect protection of iron ships from corrosion and the adherance of barnacles is a subject of very great importance, and it is engaging a great amount of attention in Europe at present. Various substances and compositions for this purpose have already been tried without effecting the object satisfactorily. It is well known that sheet copper and brass are a perfect protection to wooden vessels, and it was supposed that a paint containing copper would be equally effective in protecting iron, but it has been tried, it is said, with very adverse results. R. Griffiths, of London, the inventor of the adjustable propeller which bears his name, has lately taken out a patent for first coating the hulls of iron steamers with one or more courses of red lead paint, then with a coating composed of a mixture of tar, pitch and gutta-percha, then, while this is hot, he lays upon it perforated sheets of copper, which are thus cemented to the adhesive coating.

Improvement in Stereoscopes.—In order to neutralize the coarseness of objects seen through stereoscopic glasses, and also to produce peculiar effects, J. Hurst and J. Wood, artists, London, England, have secured a patent for applying tinted media in such a position that the direct or reflected rays of light falling on the front of the picture, may pass through the media without intercepting the vision. Such media are also applied for the passage of the rays of light on to the front of the picture, with other media at a short distance behind the picture, when the picture is transparent. This media may consist of tissue paper, gelatine, or glass; and by varying the tints very pleasing changes may be obtained at morning or evening, in summer or winter. Transparent, semi-transparent, and tinted media are also applied at a short distance behind the picture, to procure varied effects when the picture is transparent. They connect this transparent media by cords, so as to have intervals between it. They also use a lamp in some cases, with shades and lenses and media of different tints, to obtain the effects of sunrise, sunset, moonlight, and peculiar atmospheric appearances in their pictures.

What goes through the Post-office.

The outside world would be somewhat surprised, and a little amused, to witness all that is offered or goes through the Post-office Department as "mail matter." The absent soldiers are the recipients of all sorts of devices, tokens, presents, mementoes, and almost all kinds of utensils, as well as wearing apparel. Hats, caps, slippers, boots, gloves, mittens, stockings, drawers, shirts, writing utensils, photographs, locks of hair, boxes of pills, and all sorts of physic, liniment, &c. On Wednesday last, a woman appeared at the window of the New York post-office, with a small parcel of doughnuts, directed to an absent soldier; but on learning that the postage would amount to 48c., the kind lady concluded that, together with the risk of breakage, &c., they would be a dear morsel to the recipient.

HANDLING HOGS.—One can hardly form an idea of the rapidity with which hogs are disposed of in a large packing-house, without looking on, but the following notes will give some insight to the matter :—At the packing house of Messrs. R. M. & O. S. Hough, forty-six men and boys slaughtered and cut 2,023 hogs in 10 hours and 40 minutes. At the packing-house of Messrs. V. A. Turpin & Co., one cleaverman cut up 947 hogs in 8 hours 35 minutes; 385 of them into prime mess and 562 into shoulders, hams, and short sides.—*Well's Chicago Express.*

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JANUARY 13, 1863.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

37,378.—Lamp-lighting Device.—Norman Allen, West Meriden, Conn. :

I claim the combination of the chamber or receptacle, A, tube, B, and wick, C, all arranged substantially as shown and described to form a new and improved article for the purpose specified.

[This invention relates to a new and useful device for lighting coal-oil lamps and other lamps which are provided with chimneys, whereby it is rendered unnecessary to remove the chimney in order to light the lamp. The invention consists in having a tube connected with a reservoir or chamber which is supplied with alcohol, spirit gas or other similar volatile substance, the tube being provided with a wick and perforated near its end.]

37,379.—Copying Press.—J. H. Atwater, Providence, R. I. :

I claim a box copying press for the purpose of taking a copy of writing, and for the protection and safe keeping of the copying book, as herein described.

37,380.—Armor Plates for Ships and other Batteries.—B. T. Babbitt, New York City :

I claim having the bars, B C, made in wedge form and combined in the manner shown with the bars, A, and the cast metal filling, all as set forth.

37,381.—Truss.—J. T. Bartlett and E. E. Butman, Boston, Mass. :

We claim the arrangement of the two screws, D E, with the ball and socket of the pad and its arm, C, substantially as specified, the arm being applied to its spring by devices to admit of its adjustment, substantially as explained.

37,382.—Steam Generator.—Edward and John Bourne, Pittsburgh, Pa. :

We claim the combination and arrangement of the short levers, T and K, and rod, W, with the elastic head, r, in the chamber, C, substantially in the manner and for the purposes as herein set forth.

We also claim assisting the safety valve to rise when necessary by means of the rod, W, acting against the lever, H, that holds the valve down for the purpose of enabling the steam to escape, as herein set forth.

37,383.—Pump.—F. S. Burt, Mount Pleasant, Iowa :

I claim the combination of the piston, D, and the slide valve, H, working in separate compartments, E G, in the pump chamber, A, in connection with the tube, B, and the water passage, I, in the side and top of the chamber, A, and the induction openings, g g g g′, in the side of the said chamber, all being constructed and arranged as and for the purpose herein set forth.

[This invention relates to an improvement in that class of pumps which are submerged and elevate the water to the top of the well through a tube. The object of the invention is to obtain a simple, efficient and economical pump of the class specified, and one that will not be liable to get out of repair or become deranged by use.]

37,384.—Boring and Squaring-off Cylinders.—J. C. Chapman, Charlestown, Mass. :

I claim the cylinder or cutter-head or stock, E, with eccentric, F, attached, in combination with the ring, G, placed on the eccentric, and having its periphery provided with pins, n, and the nut, B, fitted within the ring, and connected with the ring, G, through the medium of the slot or groove, m, and roller, l, the above parts being fitted on the arbor, A, as shown, and all arranged to operate as and for the purpose herein set forth.

I also claim the cylinder, H, with the eccentric, U, having the ring, T, fitted on it with pins, r, attached, in combination with the plate, I, provided with the toothed rim, Q, the screw-shaft, O, gears, P P, and cutter-slides, K K, all arranged substantially as and for the purpose set forth.

I further claim the socket, W, when arranged with a slide, Y, containing the hole, v, for the center point as shown, but this I claim only when used with the implement or tools, herein shown and described.

[The object of this invention is to obtain an implement or device which may be applied to an ordinary turning lathe, and made to operate in the way of boring and squaring or facing off the ends of metal cylinders or other articles equally as well as the more pretensious and comparatively expensive machines which are now made for such purposes.]

37,385.—Machine for Manufacturing Chenille.—George Comings and Louis Mensing, New York City :

We claim the combination of a cylinder, H, and knife, L, with devices for conveying the gimp and thread, substantially as herein shown and described.

We also claim having the gimp arranged and carried upon cords, f, as herein set forth, so that chenille in pieces of any desired length may be produced, as set forth.

37,386.—Door Latch.—F. M. Crossett, Piermont, N. Y. :

I claim the loop, D, formed at the inner end of the latch, B, and provided with the beveled end or surface, c, in combination with the projection, d, on the sliding spindle, E, all arranged substantially as and for the purpose herein set forth.

[This invention consists in arranging the spindles of the knobs with the latch, in such a manner that the latch will be operated, that is to say, drawn within its case by a longitudinal sliding movement of the arbor instead of turning the same as hitherto.]

37,387.—Crutch.—H. G. Davis, New York City :

I claim an adjustable handle, E, constructed and arranged to serve in connection with the staff as and so as to realize the advantages herein set forth.

37,388.—Molds for Casting Shells.—A. J. Eddy, Brooklyn, N. Y. :

I claim the metal bush or collar, H, constructed and applied in combination with the flask, B, bed-piece, A, and core bar, E, substantially as and for the purpose herein specified.

37,389.—Machine for Casting Bullets.—J. P. Driver, Marengo, Iowa :

I claim, first, The employment in casting bullets of an endless series of molds carried by one or more endless belts or chains, or connected together to form an endless chain, by whose movement around two drums the molds are opened and closed, substantially as herein specified.

Second, The combination with the endless series of molds, of a knife or knives applied substantially as herein described to cut off the sprues of the bullets.

Third, The roller, G, applied in combination with the endless

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series of molds, substantially as and for the purpose herein specified.

Fourth, The toothed springs, i i, applied in combination with the endless series of molds, and operating as herein specified.

Fifth, The combination of the endless series of molds, the roller, G, the melting-pot, E, the knives, e e e, and the toothed springs, g g g, the whole arranged and operating substantially as herein described.

[This invention consists in an endless series of molds carried by one or more endless belts or chains, or connected together to form an endless chain, by whose movement around two pulleys or drums the molds are closed for the reception of the molten lead, and opened for the discharge of the bullets. It also consists in certain devices employed in combination with the endless series of molds for the purpose of cutting off the sprues from the bullets, and releasing and discharging them from the molds.]

37,390.—Lock.—H. H. Elwell, South Norwalk, Conn.:

I claim the plate, D, with bolt, C, attached and provided with the opening, E, in connection with the tumblers, H H, and key-hole, F, arranged substantially as and for the purpose herein set forth.

[This invention consists in constructing the lock in such a manner that it may be inverted and applied to either a right or a left hand door, and admit of the key being inserted into the lock in a proper position, that is to say, bit downward, in either portion of the lock.

37,391.—Harvester.—George Esterly, White Water, Wis.:

I claim, first, The metal draft frame, A, with its left side nearly straight and its right side angling, and the whole otherwise constructed substantially as described, in combination with the wooden plank, D, driver's seat, F, and foot guard, e, substantially as and for the purposes set forth.

Second, The arrangement consisting of the windlass, H, draft chain, I, and connection, J, or their equivalents, in combination with a draft frame and the main frame, B, substantially in the manner described, so that the draft of the machine is always on the draft chain, whether the sill, G, is stationary or being raised or lowered.

Third, The eye bolts, q q, eyes, o' o', and tongued and grooved plates, o and p, for the purpose of forming a jointed connection between the short sill, G, and finger bar, K, substantially in the manner described.

Fourth, The combination, with the elements named in 3d claim, of the slotted standard, L, slotted timber or beam, N s, and the bolts, w t, substantially in the manner and for the purpose described.

Fifth, The metal back beam, O, substantially in the form represented, applied to the top of the rear part of the main frame, B B, and to the top of the beam, N, and standing diagonally over the platform or across the space occupied thereby, and by its arched and otherwise bent form being thrown high up above the same, substantially as and for the purposes set forth.

Sixth, The construction of the back beam in form, substantially as represented, in combination with the diagonal arrangement thereof between the frame, B, and the beam, N, and with the bolts, z z, and washer, y, or the equivalent thereof, for the purpose of taking the sag out of the grain end of the finger bar, substantially in the manner described.

Seventh, The combination of the back beam, O, constructed in form substantially as represented, and an adjustable platform, U, substantially as described, for the purpose of affording a free discharge from the platform of the grain by means of a rake, although the platform may have been elevated at its rear end to a considerable hight, as set forth.

Eighth, The combination of the back beam, O, constructed substantially in form as represented, and the hinged or adjustable platform, U, and raker stand, T, located at the inner corner of the platform, substantially as described and shown.

37,392.—Header Attachment to Harvesting Machines.—George Esterly, White Water, Wis.:

I claim, first, The header attachment for harvesters combining the several elements described herein and represented in the drawing or the equivalent thereof, for use in connection with the main frame, Q, or its equivalent of a reaper or mower by being attached to the short sill of said frame, substantially as described.

Second, In a detached header organization substantially as described, I claim the construction of the horizontal and inclined portions, A A', of the spout in one piece, in combination with the supporting of the horizontal portion by hinges on the finger beam, and by chains or rods on a curved back beam, and with the supporting and adjusting of both portions together by means of an adjusting bracket of the main frame, Q, of a harvester, substantially as and for the purpose set forth.

Third, In connection with an adjustable or hinged spout, A A', of a detached header, I claim the arrangement of the adjusting, supporting brace, z, substantially as and for the purpose described.

Fourth, Leaning the stubble of the field all one way for the deposit of the grain upon it by means of the hinged or swinging portion, E, or its equivalent, of the conductor, D, substantially as described.

Fifth, The combination of the back beam, L, constructed substantially as described, with the sustaining rod or chain, v, bracket, y, support, z, and grain side beam, m, and with the main frame, Q, and spout, A A', and conductor, D E, substantially in the manner and for the purpose described.

Sixth, Providing the main frame, Q, with the brackets, y, support, z, friction rollers, 2 2, and the grooved eccentric, P, to receive a header attachment, substantially as set forth.

Seventh, The combination of the independently adjustable finger beam, H, and divider, l, with an independently adjustable spout, A A', aprons, B B, and conductor, D E, substantially as and for the purpose described.

37,393.—Broadcast Seed and Manure Sower.—Newton Foster, Palmyra, N. Y.:

I claim the combination of the obliquely pivoted vibrating stirrers, B, and driving bar, E, with the inclined seed box bottom, c, angular slotted portion, f, and regulating slides, C D, all in the manner herein shown and described.

[The object of this invention is to obtain a simple and efficient means for distributing seed and pulverulent manures from the hopper or box which contains the same—a means which will be capable of being adjusted so that a greater or less quantity may be sown on a given area as may be desired, and the device at the same time prevented from choking or clogging.]

37,394.—Lantern for Burning Coal-Oil.—Minor H. Fowler, New York City:

I claim, first, The perforations, b, in the flange or base, a, of the part, A, of the lantern, when used in connection with per forations, h, in the base, e, of the lamp, E, or with other suitable air spaces in the bottom of the lantern and with or without the perforations, d, in the rim, c, as and for the purpose herein set forth.

Second, Constructing the base, e, or the lamp, B, with ledges or bearings, f, substantially as shown and described, in connection with the rim, c, or other equivalent bearing attached to the part, A, for the purpose of admitting air spaces, g, around the base, e, as set forth.

Third, The combination of the perforations, b, in the flange or base, a, of the part, A, of the lantern; the perforations, h, in the base, e, of the lamp; the air spaces, g, found by the ledges or bearings, f, on the base, e, and the rim, c, or its equivalent—all arranged as and for the purpose herein set forth.

37,395.—Pipe Tongs.—Henry Getty, Brooklyn, N. Y.:

I claim, first, The hook-jaw constructed as shown in combination with a stationary serrated cam lever, for the purpose specified.

Second, In combination with the same, I claim the finger-rest, D, for the purpose set forth.

37,396.—Cooking Stove.—R. D. Granger, Albany, N. Y.:

I claim, first, In combination with the elevated oven, making the bottom of the oven double with an air-space between the two provided with a pipe, p, or its equivalent for the supply of cold air, substantially as described, whether such air space be made to communicate directly with the flue or with the oven as described, to insure the circulation of air, through the said air chamber, and thereby prevent the over-heating of the bottom of the oven.

Second, In combination with the elevated oven and the air chamber at the bottom of the oven, substantially as described, connecting the said oven by apertures with the said air chamber and the flue spaces, substantially as described, so as to cause a circulation of heated air through the oven, as described.

Third, In combination with the two compartments one above the other and separated by a plate, the arrangement, substantially as described, of the apertures for the circulation of air through the said ovens, whether the air be admitted so as to circulate in the lower oven from the ends to the middle, and in the upper one from the middle toward the ends, or vice versa, as described.

37,397.—Winding Clocks by Currents of Air.—Robert Hitchcock, Watertown, N. Y.:

I claim, first, In combination with the shaft of a clock-operating spring I claim a flutter-wheel constructed as described, having its vanes so connected and hinged to radial spindles on said shaft, as that the said vanes shall be allowed of being opened and closed and be made self-opening by their weight essentially as shown and described.

Second, The combination for joint operation of fore-and-aft flutter-wheels, the one having movable or opening and closing vanes and the other immovable ones, as described.

Third, Controlling the opening and closing of the movable vanes of a flutter-wheel by the action of the main-spring of a clock, substantially as specified.

Fourth, The combination of devices consisting of the stop or stud on the main spring barrel, the notched wheel gearing at intervals from the former and provided with an inclined plane, the sliding collar on the main spring arbor and lever, hand and sliding collar operated thereby, or the equivalents of these devices for the purpose herein described.

37,398.—Machine for Cutting Files.—Seth Hoke, of Union City, Ind.:

I claim the hammer handle, I, having the pendent bar, K, attached to it and provided with the ledge or shoulder, M, in connection with the frame, Q, provided with the cutter, R, and the bar, U, provided with the projection, o, the wheels, E G, provided with the pins, a' h, the bed, B, and screw, D, all arranged substantially as and for the purpose set forth.

I further claim pivoting the cutter frame, Q, in slides, O O, for the purpose of regulating the height, of said frame as described, but this I only claim when the frame is used in connection and arranged with the parts herein specified for the purpose set forth.

37,399.—Camp Stove.—J. Hope, Castleton, Vt.:

I claim the top or cover, A, with its flange, B, its aperture, d, its holes and pins, c c c c, its slide or door, G, in combination constructed substantially as herein described.

37,400.—Sheet Metal Can.—Solomon Hunt, Danville, Ind.:

I claim the combination of the levers, B, springs, C D, bearing piece, F, and segments, A, with or without the slide, G, arranged for joint operation as and for the purpose specified.

[This invention relates to a new and useful implement or device to be used in the construction of sheet-metal cans, such as fruit-cans and the like, whereby the manufacture of the same is not only materially facilitated, but a cheaper quality of sheet-metal—tinned plate—rendered capable of being used.]

37,401.—Mode of Raising Sunken Vessels.—Frederick Kettler, Milwaukie, Wis.:

I claim, first, The construction of the screw auger, a b, as herein described.

Second, I also claim the screw auger as combined with rods, 11, and 12, plate, 13, pulleys, 14, ropes, 16, teeth, c, and balloons, d, when arranged as herein specified, to form the instrument or machine, C, for raising sunken vessels.

37,402.—Defensive Armor for Ships and other Batteries.—Gervase B. Manley, Danville, Pa.:

I claim the combination of the plates, a, tongues, c, or c', and bolts or rivets, b, when the said plates are placed in planes perpendicular to the surfaces to be protected, the bolts or rivets passed directly through the tongues in the center of the plates and perpendicularly to the latter and all the parts constructed, arranged and secured in the manner and for the purposes specified.

[In this invention the plates are so constructed and applied as to interlock throughout the entire structure, and effectually protect the fastenings from injury.]

37,403.—Drying Grain, Malt, &c.—Sylvester Marsh, Chicago, Ill.:

I claim the method of drying hops, broom corn, grain, and other like substances, by the employment in combination with anthracite coal or coke as fuel—of any artificial current of air over the fire, substantially as herein shown and described.

37,404.—Feeder for Lamps.—Theophilus Mayhew, Poughkeepsie, N. Y.:

I claim the screw thimble, formed by the sockets, c, and d, applied between the burner, and the collar on the lamp in the manner specified, whereby said burner and lamp are connected, but the lamp burner can be raised for filling the reservoir without unscrewing the burner as specified.

37,405.—Hoe.—Elihu C. & John W. Newland, Lawrence county, Ind.:

We claim the arrangement of the socket, A, provided with the projections, P P', and the plate, H, having corresponding notches and attached to the socket by means of the screw, S, all constructed and operating as and for the purpose described.

37,406.—Safety Nipple Guard for Fire-arms.—John Oliphant, Uniontown, Pa.:

I claim the gun nipple-guard, J, provided with the inclined planes, g g, and slit, n, the slot, m, screw, k, and spring, o, arranged and constructed as shown and described for the purpose set forth.

37,407.—Breech-loading Fire-arm.—John Oliphant, Uniontown, Pa.:

I claim, first, The steel pin, r, provided with the nipple, s, in combination with a vibrating, reciprocating charge chamber as described, &c.

Second, The hammer, F, constructed with the flange, m', arranged as described, working on the side of the gun, in combination with a reciprocating nipple, substantially as described and for the purposes set forth.

Third, The cam, f'', attached to the tumbler of a gun lock, in combination with the sliding steel pin, G'', constructed and operating substantially as described.

Fourth, The cam, g', attached to the sere of a gun-lock, in combination with the trigger, G', the steel sliding pin, G'', and the cam-shaped projection, f'', substantially and for the purposes described.

37,408.—Raking and Binding Attachment to Harvesters.—Theodore Palmer, Catskill, N. Y.:

I claim, first, The combination of the rake, B, endless chain, D, guide, e, ledges, k'' k''', and beveled bar, l, all arranged as shown to admit of the rake, B, operating as and for the purpose herein set forth.

Second, The manner as shown of operating the hooks, t t, or turning the shaft, J, thereof, to wit: by means of the wheel, M, provided with a smooth and toothed periphery, the plate, d', connected with the india-rubber, g', the bar, j', provided with the pawl, m', and the cam projections, v v' v'', on wheel, I, all arranged as and for the purpose herein set forth.

Third, The combination and arrangement of the lever, R, arm, T, hook, s', cutter, Y, arm, Z, with the projection or knob, i*, at its end, arm, w', and the slide, A', on the central tooth, p, of the shaft, G, all arranged to operate as and for the purpose specified.

[The object of this invention is to obtain a raking and binding attachment, which may be applied to a harvester and operated from the driving-wheel thereof, so as to gather or rake up the cut grain from the platform into gavels, and bind the same with a cord, the latter being tied with a knot so as to ensure the firm binding of the sheaves.]

37,409.—Manufacture of Palm-leaf Hats and Bonnets.—David C. Perrin, Roxbury, Mass.:

I claim the palm-leaf strip made in the manner substantially as above described for the purpose specified.

37,410.—Machine for Seaming Metal Roofing.—John Sidons, Rochester, N. Y.:

I claim, first, Inclining the axes of the folding rollers, C, and E, as described, so that their rotation, by means of the friction between them and the sides of the seam shall cause them to hug the roof effectually.

Second, The employment of the closing roller, D, constructed and arranged in the manner specified, in combination with the folding rollers, C, and E, and the compressing rollers, C'.

Third, The combination of the spring, g, and set screw, h, with the adjustable box, B'', whereby the roller, E, is allowed to yield and adapt itself to any inequalities of thickness in the seam, such as cross seams, and the different thickness of metals used.

Fourth, Preventing the rear end of the machine from rising from the roof while in operation, by means of the shoulder of the gain, p, in the right-hand compressing roller, C', of the rear set, catching under the fold of the seam, as specified.

Fifth, The self-adjusting seat, S, constructed and arranged substantially as described, in combination with the other parts of the machine.

37,411.—Construction and Defense of War Vessels.—E. A. Stevens, Hoboken, N. J.:

I claim, first, Lowering a war vessel in the water so that a water-protected deck shall be lower than the surface of the water outside, substantially in the manner and for the purpose described.

Second, The buoyant structure, substantially as described, applied to a partially or wholly submerged war vessel to impart stability and buoyancy thereto.

Third, The buoyant structure referred to in the foregoing claim, in combination with a protected deck situated or placed below the water line of a war vessel, substantially as described.

Fourth, An air vessel constructed in any suitable manner and combined with any of the water compartments or vessels specified, substantially as and for the objects described.

37,412.—Coking Coal and Generating Gases.—W. G. Valentin, Oxford street, London, England. Patented in England, Feb. 13, 1862:

I claim coking coal in close chambers or retorts heated externally by the combustion of gases generated from similar previous coking operations and applied in the manner herein set forth.

I also claim the use of the vertical close chambers or retorts, a, in combination with the external flues or heating channels supplied with combustible gases and air from the burners, f.

I claim the use and application of the combination of parts whether for coking coal or generating combustible gases for heating and lighting purposes.

37,413.—Water-proof Shoes.—T. C. Wales, Dorchester, Mass.:

I claim the improved cemented or water-proof shoe or combination of a binding cord, c, and a lapping band or cover, d, together and with the two folds or layers, e f, of the upper, substantially as hereinbefore specified.

37,414.—Beehive.—W. W. Walker, Nettle Lake, Ohio:

I claim the arrangement of the gauze openings, E F, and the passage ways, M N, with the gauze openings, m n, in combination with the hive, substantially as set forth.

37,415.—Machinery for Manufacturing Chenille.—William Canter (assignor to Samuel Bernstein), New York City:

I claim, first, The employment in chenille machines of the revolving sheave or wheel, N, operating in combination with the cords, M and Q, and swivel, P, substantially as herein set forth.

Second, The employment in chenille machines of the surface, G or H, or both, to restrain the twist of the goods, substantially as herein set forth.

Third, The use, in chenille machines, of the continuous wire, W, or its equivalent, arranged to operate substantially in the manner and with the advantage herein set forth.

Fourth, The employment in machines for making chenille of the sheave, 3, or its equivalent, arranged to operate in combination with the continuous wire or cord, W, substantially as and for the purpose herein set forth.

37,416.—Stove.—William Wheeler, Poultney, Vt.:

I claim the soapstone or other equivalent slowly-conducting radiating case, combined with an interior furnace and a close air space, S, which is next to and immediately surrounds the furnace and its flue, substantially as and for the purpose herein specified.

I also claim the slide, U, with the draught aperture, u, between the grate and ash pan, substantially as and for the purposes set forth.

I also claim the perforated chamber, W, when attached to and used in combination with a tilting grate, N, so as to receive lateral vibratory motion therefrom, and thereby serve the additional purpose of breaking the coal crust at the top, substantially as specified.

I also claim the double-flanged flange-plates, F G H I K L, constructed and arranged substantially as described, in combination with the soapstone staves, for the purpose specified.

I also claim the combination of the annular flue, Q, with the annular door air-space, S, and slowly-conducting radiating case, substantially as herein set forth.

37,417.—Eyeleting Machine.—Sinson De Forest (assignor to himself and T. B. De Forest), Birmingham, Conn.:

I claim the employment of a table or supporting surface to sustain the work or material being eyeleted, substantially as hereinbefore set forth.

I also claim the employment, in combination with the work-supporting table, of two sets or dies, d and o', the lower one receiving and carrying up the eyelet through the work-table and the two operating together to clench the eyelet, substantially as hereinbefore described.

I also claim the combination of the two dies, d and o', with a perforating punch, c, and work-supporting table or surface, the whole operating substantially as described for the purpose set forth.

I also claim forming a conduit or passage in the table, H, in combination with a feeder, i, or its equivalent, whereby an eyelet deposited in the said conduit is fed into the die, d, substantially as described.

I also claim the employment of a chute, I, constructed substantially as described, in combination with a hopper, J, whereby the eyelets thrown promiscuously in the said hopper are fed or conducted in a given position to the mechanism for presenting them to and securing them in the work, substantially as hereinbefore described.

37,418.—Eyeleting Machine.—T. B. De Forest (assignor to himself and Sinson de Forest), Birmingham, Conn.:

I claim the employment in combination with a hopper and shaking table, substantially as described, of a mechanism for turning those eyelets which start in a wrong position over into the proper position, substantially as set forth.

I also claim, in combination with a conductor, J, or its equivalent, a device for discharging from it all eyelets which may have entered it in a wrong position, substantially as hereinbefore described.

I also claim forming a lip, 19, or its equivalent, on the forward end of the feeder to prevent the displacement of the eyelets, substantially as hereinbefore set forth.

37,419.—Machine for cutting Files.—Major H. Fisher (assignor to the Franklin File Company), Bridgeport, Conn.:

I claim, first, The inclined notch, i, in the chisel.

Second, The adjustable spring, c, in combination with the notch, i, substantially as and for the purposes described.

34,420.—Railroad Snow Plow.—B. A Johnson (assignor to himself and Earl Blossom), North Auburn, Maine:

I claim the side walls, c, side slides, S, swing bar, B B, grooves, P P, top covering, t, and the opening or space through which the snow passes, combined and operating in connection with the wheels, W, draw bar, D, frame work, A A, pulleys, x, chain, L, rope, R, spring S S, break or upright shaft, O, moldboards, M and i, inclined plane, P, and swing center board, A, substantially as set forth, and for the purpose specified.

37,421.—Construction and Location of Paddle Wheels.—Henry Randall, Philadelphia, Pa., assignor to himself and J. P. Baldwin, New York City:

I do not claim the use of four wheels to a steamer, but I claim their peculiar location in combination with the ship, the engines and with each other, namely:—

I claim the application of four wheels (two pairs) when each pair is disconnected from the other, driven by independent engines, and the after pair is so much larger than the forward pair as to take up the slip of the latter when making the same number of revolutions, substantially as described; said after pair, moreover, being located at such distance from the other pair as to be, in the water, made comparatively smooth by the latter; and, finally, so located in regard to the hull of the ship, and their buckets so arranged as to throw the water well inward under the run of the vessel, and relieve her from the dead or partially-towing water, substantially as described; the whole being for the objects and reasons explained.

37,422.—Tool for inserting Putty beneath Vault Glasses.—Franklin Smith, Dorchester, Mass., assignor to himself and G. W. Smith, of the same place; S. A. Denio, Chas. Roberts, Ammi Smith, of Boston; and Joseph Lovett, Somerville, Mass.:

I claim the within-described tool constructed and operating substantially as set forth for the purpose specified.

37,423.—Tea Kettle.—B. H. Monke, of Cincinnati, Ohio assignor to Chamberlain & Co.:

I claim the pot or kettle, A, having the described chamfer-headed and conical-necked ear, D, and correspondingly perforated lid, B, the whole being secured by the insertion of the bail, in the manner set forth.

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37,424.—Sorghum Wine.—A. Myers, Springfield, Ohio. Ante-dated July 13, 1862 :

I claim, first, Sorghum wine prepared substantially as described.

Second, The process of fermentation substantially as described.

37,425.—Gas Pipe Joint.—R. C. Robbins, of Jersey, N. J.:

I claim the method of forming the packing by means of casting lead or other suitable material ina circular groove in the mouth of the socket of a pipe and into which the tapering end of the succeeding pipe is intended to be forced in the manner and for the purpose substantially as set forth.

37,426.—Mordant for fixing Aniline Colors.—Alexander Schultz, Lyons, France :

I claim the preparation and use of the mordant hereinbefore described for fixing aniline or other coloring matter extracted from coal tar upon fibrous or textile material, the said mordant consisting essentially in the combination in various proportions of acetate of alumina with arsenite of soda, and whether used separately from but in connection with or as a mixture with the said coloring matter or otherwise, substantially as herein set forth.

RE-ISSUE.

1,386.—Electric Bath.—M. W. House, Cleveland, Ohio. Patented Feb. 18, 1860 :

I claim, first, The combination of the tray, b b, with the longitudinal insulator, J, for the purpose described.

Second, The combination of the tray, b b, or its equivalent, with the head plate, c, whereby the quantity of electricity may be regulated, substantially as and for the purpose described.

Third, The traveling movable poles or electrodes, e e', working on arms, f f, or their equivalents, when those arms are movable, substantially as described.

Fourth, The movable poles, e e', with the sponges, d d, when arranged in such a manner that they can be freely changed or rotated on all sides of the patient, except as limited by the support, J, causing the electric current to pass in any given direction through any part of the patient's body in the way substantially above set forth.

EXTENSION.

6,026.—Lubricating Compound.—P. S. Devlin, Reading, Pa. Patented Jan. 16, 1849 :

I claim the combination of a solution of caoutchouc or other similar gum with animal or vegetable oil or fatty matter, substantially as specified, applicable as a substitute for oil in lubricating machinery and for other purposes.

DESIGN.

1,704.—Design for the Air Jacket of a Lamp.—G. B. Halstead of New York City :

NOTE.—The Patent Office is in a very flourishing condition, notwithstanding a very large number of the inventors of the country are in the army. In the above list of patents we recognize the names of SIXTEEN patentees whose papers were prepared at the Scientific American Patent Agency.—EDS.

Magazines and other Publications Received.

THE AMERICAN JOURNAL OF PHOTOGRAPHY. Published semi-monthly by Seely & Bartlett, 244 Canal street, this city.

This periodical continues to flourish. It is an interesting an most valuable publication for photographers and all persons connected with the arts allied to photography, especially chemistry. All the statements contained in it are made with great caution, and the subjects treated in it exhibit careful thought and much discrimination, which render it very reliable to its readers.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides, covered with marble paper and morocco backs and corners.

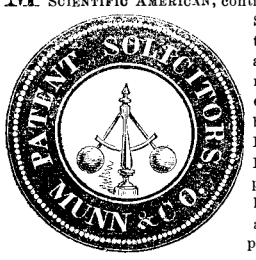
Believing that the latter style of binding will better please a large portion of our readers, we shall commence on the expiration of this present volume to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style will be 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row New York.

IMPORTANT TO INVENTORS.

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court. Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.



THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one ; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents ; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from **$30** down to **$15.** Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of ejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London ; 29 Boulevard St. Martin, Paris ; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

Notes and Queries

F. T. E. B., of Ky.—Pike & Son, Broadway, this city, manufacture and sell apparatus for producing and exhibiting the Drummond Light. You will find it troublesome to use for your purpose.

J. J. E., of N. Y.—The mere substitution or the use of one material for another in any manufacture is not patentable. The use of a linen fabric in place of cotton or wool is not patentable.

W. S., of Ill.—You can buy the pure metal potassium of J. F. Luhme & Co., No. 556 Broadway, New York.

S., of Conn.—You will find a projectile similar to the one proposed by you illustrated on page 384, Vol. VI (new series) of the SCIENTIFIC AMERICAN. Silicate of soda is sold by L. Feuchtwanger, of Maiden Lane, this city. We do not know the price of it.

J. A., of Ill.—We cannot tell you how well your invention would be received. Such features as you speak of are objectionable, but whether the builders of marine engines would adopt your improvements is quite another question.

D. E. J., of Pa.—Unless you can procure the Patent Reports from the Commissioner of Patents or from your member of Congress we do not see how you can get hold of them. The Commissioner has but few copies at his disposal for circulation among the patentees whose names are recorded in the Report.

T. H. L., of Wis.—Needles that can be threaded by the blind and aged were sold on the streets of this city for a long time Of late we have seen nothing of them, and cannot inform you where they can be had.

M. P., of Pa.—The best way known to us for cleaning a meerschaum pipe is to boil it for a few minutes in strong soap-suds, then wash it in clean water. If it has a tip of amber it must be first removed.

C. P. S., of Philadelphia.—Billiard balls are colored red by being boiled for a few minutes in a tin or copper dipper containing some ground cochineal, a little cream-of-tartar and a few drops of the muriate of tin. The ball should be washed in soop-suds to remove grease from its surface before it is colored. About one-eighth of an ounce of cochineal, the same quantity of cream-of-tartar and a few drops of the muriate of tin will color two balls. Wash them in cold water after being colored.

L. D. N., of N. Y.—All young mechanics are generally fascinated with the subject of perpetual motion. By continuing a subscriber of the SCIENTIFIC AMERICAN you will soon learn that the perpetual motion is a mechanical fallacy.

G. W. C., of Ohio.—The person who undertakes to prove that action and reaction are not equal must hoist upon a bigger lever than that which Archimedes proposed to raise the world, if he could get a fulcrum for it.

J. W. A., of Mass.—Copal varnish is made by first fusing the gum, then pouring boiling linseed oil among it and continuing the boiling. Oil is the solvent that is commonly used for copal.

E. K. B., of Harper's Ferry.—You will find a description of the method of making sun-dials in almost every good work on natural philosophy. It would take up too much of our space to give the diagrams and rules for their construction.

W. S. S., of Maine.—Eye-stones are smooth calcareous stones employed to open the eyelids of persons for the purpose of removing mots from the eye; skilled oculists never use them. The reason why they appear to move when placed in vinegar is owing to the action of the acid which decomposes the stone. By carefully turning over the eyelid any substance can be readily removed.

J. J. T., of Iowa.—We do not know the present price of old papers. The price has fallen at least one-half since we sold.

S. P., of Vt.—We believe the agent of the American West India Company is Richard B. Kimball, of this city.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, January 14, to Wednesday January 21, 1863 :—

J. H. B., of Mass., $15; T. W., of Ill., $10; T. & N., of N. Y., $15; A. H., of Iowa, $15; G. S. A., of N. Y., $350; W. H. M., of Iowa, $15, M. H. S., of Ohio, $15; M. & B., of Ill., $10; J. W. G., of Mass., $15; S. B. E., of Conn., $15; H. G., of Pa., $15; J. R. S., of Pa., $25; J. O. T., of Ohio, $25; W. S. P., of Mich., $25; W. P., of Mass., $15; G. B. McD., of Ky., $35; A. H. C., of Wis., $15; A. T., of Wis., $15; F. B. S., of N. J., $230; B. & H., of Conn., $25; J. M. Y., of N. Y., $15; T. K., of Ill., $30; T. & J., of N. Y., $15; F. & K., of Cal., $93; R. R., of Ill., $25; J. C., of Mich., $30; B. C. C., of Maine, $30; C. H. G., of C. E., $15; D. U. & B., of Maine, $130; F. P. S., of N. Y., $12; N. J., of Ind., $20; J. D., of Ky., $20; J. W. S., of N. Y., $15; A. A. W., of Mich., $84; J. T. M., of N. Y., $20; H. A. H., of N. Y., $20; W. M., of N. Y., $15; J. F. T., of N. Y., $15; G. W. H., of Mass. $20; W. T., of Wis., $20; G. T. L., of Pa., $25; B. H., of Vt., $15; S. S., of N. Y., $55; S. J. S., of N. Y., $15; A. H., of Iowa, $15; F. W. G., of N. Y., $15; H. W., of Cal., $10; A. M. S., of N. Y., $20; A. J. & H. E. S., of N. Y., $25; G. W. T., of Mich., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to

parties with the following initials have been forwarded to the Patent Office from Wednesday, January 14, to Wednesday, January 21, 1863:—

F. P. S., of N. Y.; S. S., of N. Y.; P. E. R., of England; F. F. P., of France; G. W. T., of Mich.; M. & B., of Ill.; A. J. & H. E. S., of N. Y.; J. O. T., of Ohio; J. R. S., of Pa.; R. R., of Ill.; J. B. McC., of Mo.; C. A. M., of Wis.; J. C., of Mich.; C. B. R., of Pa.; E. M., of N. Y.

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RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payble in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline publish.

For further particulars, address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
New York City

STEAM FIRE-ENGINES.—FIRE-ENGINE MAKERS, MECHANICAL ENGINEERS, and Others, are hereby informed that a FUND has been SUBSCRIBED for the purpose of GIVING PREMIUMS to the Manufacturers of such STEAM FIRE-ENGINES as shall, upon a trial, prove to be the most efficient for the purpose for which they are constructed.

The arrangements for this purpose, the conditions on which the several Manufacturers will be admitted to competition, and the award of the Premiums, will be carried out by a Committee consisting of the following gentlemen :—

CHAIRMAN.
His Grace the DUKE OF SUTHERLAND.

MEMBERS.
The Right Honourable the EARL OF CAITHNESS.
LORD RICHARD GROSVENOR, M. P.
J. G. APPOLD, Esq.
J. F. BATEMAN, Esq.
W. M. BROWNE, Esq.
T. R. CRAMPTON, Esq.
J. HAWKSLEY, Esq.
J. E. McCONNELL, Esq.
J. NASMYTH, Esq.
W. SMITH, Esq.
CAPT. E. M. SHAW, HONORARY SECRETARY.

The Committee hereby offer the following premiums for the Best Steam Fire-Engines, to be tested in London on the 1st of June, 1863.

The Engines produced for trial will be divided into two classes—the small class consisting of those not exceeding 30 cwt., and the large class of those exceeding 30 cwt. and not exceeding 60 cwt.; these weights not including coal, water, hose or other gear.

The Premiums at present offered are £250 for the best Engine, and £100 for the second best in each class.

The Committee hope it will be shortly in their power to open a third class, which will include Self-Propelling Engines, without reference to weight.

The chief points to which the Committee purpose to direct their attention, in addition to the consideration of cost and weight, are those which relate to the general efficiency of the machines as Fire-Engines, combining, among other points of excellence—

Rapidity in raising and generating steam;
Facility of drawing water;
Volume thrown;
Distance to which it can be projected with the least amount of loss;
Simplicity, accessibility, and durability of parts.

The Committee reserve to themselves the power of modifying or withholding altogether these Premiums in the event of no Engines being produced which they consider deserving of commendation, and competitors are hereby informed that the decision of the Committee on all points is to be final and without appeal.

Communications to be addressed to CAPTAIN E. M. SHAW, Honorary Secretary of the Committee, 68 Watling street, London, E. C.
5 2

EVERYWHERE TRIUMPHANT.
GROVER & BAKER'S CELEBRATED SEWING MACHINES
Have taken the First Premium at the State Fairs last held in

NEW YORK,	ILLINOIS,	KENTUCKY,
NEW JERSEY,	MICHIGAN,	TENNESSEE,
OHIO,	IOWA,	VIRGINIA,
INDIANA,	MISSOURI,	ALABAMA,

NORTH CAROLINA AND CALIFORNIA,
including every State Fair where exhibited in 1862.
Office, 495 Broadway, New York. 5 4

EMPLOYMENT.—THE FRANKLIN SEWING MACHINE COMPANY want traveling agents at a salary of $40 per month and expenses paid. For Circulars, Book of Instructions and Specimen Machine, address (with stamp), HARRIS BROTHERS Boston, Mass. Local agents allowed liberal commissions. tf

THE MOTHERS' JOURNAL.—A LITERARY AND RELIGIOUS Monthly Magazine for Mothers and the Household. One dollar a year. 335 Broadway, New York. 1*

WANTED TWO LOCOMOTIVE BOILERS.—A. E. JEROME, New Westfield, Wood county, Ohio. 1*

VALUABLE MILL PROPERTY FOR SALE, CONSISTing of a Grist Mill, Saw Mill, Shingle and Planing Mill; also a Sash, Blind and Door Factory, all in good repair, with a never failing water-power. Situated on the Chemung river, two miles from Waverly, N. Y., on the Erie Railroad, will be sold cheap. Apply to BROWN, ROUNDS & DUNNING, at Waverly, N. Y. 5 3*

WHAT EVERY MECHANIC AND AMATURE SHOULD have.—One of Parr's Tool Chests fitted up with complete sets of tools sharpened and set ready for use, and packed in cases for shipping. Boy's size containing 44 tools, price $9; Gentlemen's size containing 80 tools, price $22; Youth's containing 62 tools, price $14; Planter's and Farmer's, containing 92 tools, price $32; also smaller chests for Juveniles, at $2, $3 and $4 each. Shipped on receipt of price by GEO. PARR, Manufacturer, Buffalo, N. Y. Send stamps for circulars. tf

MILLSTONE-DRESSING DIAMONDS, SET IN PATent Protector and Guide. For sale by JOHN DICKINSON, patentee and sole manufacturer, No. 64 Nassau street, New York City. Also manufacturer of Glazier's Diamonds. Old Diamonds re-set. 5 12*

WANTED BY THE ASSISTANT IN THE LABORatory of Practical and Analytical Chemistry of Union College, a situation in some manufacturing establishment. Apply for information to Prof. CHANDLER, Schenectady, or to Prof. C. A. JOY, Columbia College, New York. 5 2*

PAYE'S PATENT FORGE HAMMER, A HAMMER adapted to both heavy and light forgings. The force of the blow being entirely at the will of the operator. This hammer is adapted to both heavy and light forgings; the force of the blow being entirely at the will of the operator, and for all forgings under six inches, both round or square, is the best hammer now in use, and requires but one-half the power used by every other hammer to do the same work. For an engraving and description of this hammer, see page 1, Vol. V (new series) of the SCIENTIFIC AMERICAN; some valuable improvements have, however, been since made. All communications should be addressed to H. M. Ames, Box 422, New York, or Ames Iron Works, Oswego, N. Y.

These hammers may be seen in operation at the Allaire, Neptune, Secor, Delamater, Fletcher & Harrison, Duncan & Crampton, Anderson & McLaren, Duhurst & Emerson, Charles T. Porter, all in New York City; Joseph Colwell, Jersey City; Wm. White, Newark, N. J.; Providence (R. I.) Tool Co.; Whiting & Wilcox, Kaighn's Point, Phila.; Mallory & Cottrell, Mystic, Conn.; J. Dillion, Rondout; James Horner & Co., Sing Sing; Henry Esler & Co., Brooklyn; James B. Eads, St. Louis, Mo.; Central Railroad Shop, Albany; Burlington, Quincy & Chicago Railroad Shop, Ames Iron Works, Oswego. 1*

MODEL-MAKING FOR INVENTORS, BRASS CASTing and Finishing, light machinery made to order. Sees' Self-Feeding Tallow Cups for Locomotive Steam Chests. To companies or superintendents wishing to test them, one sent free of cost. SEES & CO., 415 Grand street, Philadelphia, Pa. 5 4*

IRON CASTINGS AND MACHINES OF EVERY DEscription made to order in a reliable and economical manner. Wood Work, Pattern Fitting and Agricultural Implements; all the celebrated Peekskill plows, both iron and wood beams. Our wood work is rendered imperishable by the French Kyanizing Process. See our card on the New York Lamp-post Letter-boxes. Office and foundry adjoining Hudson River Railroad Depot, Peekskill, N. Y.
1* J. B. BROWN & CO.

BLACKSMITH WANTED.—A THOROUHLY COMpetent practical man to take charge of 12 to 15 hands, with trip hammers and miscellaneous hand forges of moderate sizes, with hard and soft coal fires, and capable of turning off work rapidly and in the most economical manner. Address personally or by letter, stating the kind of work the applicant has been most accustomed to, with full reference as to capacity and character. J. B. COLLIN, 76 Sudbury street, Boston, Mass., or Box 2,048, New York Post Office. 1*

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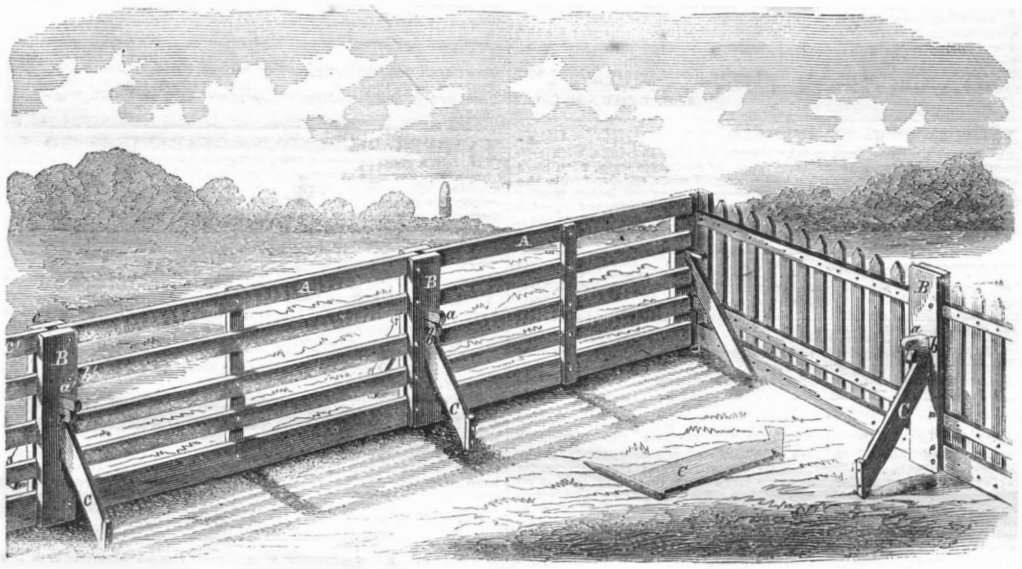
Improved Field Fence.

There is always a great demand for cheap and easily adjusted fences, especially out in the vast prairies of the West. Several of these structures have been illustrated in our columns, and we herewith present our readers with the latest improvement made in them. This fence consists of the usual longitudinal bars, A, confined by uprights, B, at regular intervals, secured by nails to the bar before mentioned. The sizes of the panels alternate, there being a large one to which the diagonal braces, C, are attached, followed by lesser uprights; these are fastened on opposite sides of the longitudinal bars, as will be seen by referring to our engraving. The peculiarities in this fence consist in the method by which the diagonal braces are secured to the uprights, in such a manner with reference to the main structure that they, by the aid of the gib and key, *a* and *b*, bind the whole firmly together, and at the same time steady it against being thrown down by the wind or other natural agents. The fence is made in sections, so that the upright *a* is fastened on one side to the bars, *b*, the opposite upright *c* is also secured at *c''*, to its longitudinal bars. It will be easily seen that when the gibs and keys are driven through the uprights they fasten the two sections together, and yet allow of some elasticity of motion; this latter feature is necessary in rolling ground.



COSGROVE AND WESTERMAN'S FIELD FENCE

The tops of these diagonal braces are made of a peculiar shape and embraced by the jaws of the gib, as shown by the detached brace lying in the foreground of the engraving. The bottoms of the braces butt against stakes which are driven into the ground. This improvement in fences prevents the necessity of digging any post-holes, and is, as the intelligent reader will readily discover, advantageous in many ways. One section of the fence represents a picket fence constructed with this improvement, it can be quickly applied to any form or style of fence desired. The patent for this invention has been applied for through the Scientific American Patent Agency, and the claim will appear in our next issue. Further information can be obtained regarding it by addressing the inventors, T. K. Cosgrove and R. Westerman, at Fort Wayne, Ind.

The Melting of Steel in Large Masses.

Steel for casting is usually melted in crucibles and poured into molds. This is a troublesome operation and is very defective, because a very limited quantity of metal can be melted in one crucible, and several pourings from different crucibles are required for castings of moderate magnitude, while large steel castings are almost impossible by this mode of melting. An improvement upon this system has lately been effected in France, and a paper upon the subject has been read by M. A. Sudre, before the Paris Academy of Sciences. The new method of melting steel consists in subjecting it to heat on the concave hearth of a reverberatory furnace. While the steel is being melted it requires to be covered to protect it from oxidation. The substance which has been successfully used for this purpose is the slag or scoria of charcoal smelting furnaces, and bottle glass answers equally well. The bottom and sides of the furnace are also protected with this slag so as to exclude the air completely from the steel. Under its slag covering, soft steel melted easily in the reverberatory furnace, and it remained unaltered in quality. Slightly carbureted steel melted in four hours in the furnace, with the consumption of two pounds of coal to one of steel. The same slag answered for several successive meltings. The melted steel was run off by a tap easily, and a furnace lined with good fire-brick lasted during thirty meltings. The experiments were conducted at the Montalaire Iron-works, under the orders of the emperor; and masses of half a tun of steel were thus easily melted. The cost for melting was less than half incurred by the usual mode of using crucibles. In large reverberatory furnaces, constructed for the purpose, large masses of steel weighing several tuns may thus be melted for casting the shafts of steam engines and large guns.

Talking.

The majority of people now-a-days, seem to give very little consideration to the use of their tongues. Stammering is very common, and this is occasioned in very many cases by a slovenly and careless way of talking. Rapid and imperfect utterance takes the place of pure and careful articulation; it is rather better to be a Cockney, and pronounce words clearly, than to clip them short, as is the almost universal custom. Our countrymen have discovered doubtless that talking, like eating, takes time, and are consequently indisposed to give much of it to either duty. For example, what does this word mean: "jelluk?" It is a popular vehicle of comparison, but what sense is there in it?—who would ever recognize, but for the sequence, the phrase "just like." And yet very many persons who know better will very gravely assert that this or that is "jelluk" this. So also the idiom "sezzi" or rather "s'zi" (for "says I"); there never was a poor adverb so abused before. Shorn of all its proportions it passes, like a shinplaster, for any value that may be attached to it. We cannot, of course, be all linguists and elocutionists, but we may at least give some slight attention to the organs of speech and use them as nature and grammarians intended they should be used. Tongues are not made merely to be wet with fluids; they are sometimes used for imparting intelligible sounds.

The Demand for American Machinery Abroad.

We lately published a letter in the Scientific American from an inventor, showing that he had received orders for his machinery from remote parts of the globe; as for instance Syria and some of the cities in Asia. Quite recently we have received a letter from a correspondent of ours in New Zealand, who, while ordering several copies of the Scientific American to be sent him, desires to have us forward some illustrated catalogues of machines and machine-works. Our correspondent, having three mill-streams in his possession, wishes to get some information of the best tools for wood-working as also the most approved plans for turbine wheels. Manufacturers and others interested, will confer a favor by sending their catalogues to this office, as we are about communicating with the writer of the letter just mentioned. The address is Messrs. E. Gibbons & Co., Niagara Saw Mills, Manukau, *via* Auckland, New Zealand.

Canal across the Isthmus of Corinth.—A letter from Athens says:—"A company has been formed in Greece for cutting through the Isthmus of Corinth, and thus avoiding the long and dangerous coasting of the shores of the Peloponnesus. The width of the canal would be 112 feet, and its depth about 20 feet. Its length would not exceed three miles and three quarters. For vessels on their way for Marseilles and the Mediterranean to the Piræus the distance would be shortened by ninety miles. The saving to vessels from the Adriatic would be still more considerable."

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The SCIENTIFIC AMERICAN is indispensable to every inventor as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week, the best scientific journals of Great Britain, France and Germany; thus placing in our possession all that is transpiring in mechanical science and art in those old countries. We shall continue to transfer to our columns copious extracts from those journals of whatever we may deem of interest to our readers.

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No person engaged in any of the mechanical pursuits should think of doing without the SCIENTIFIC AMERICAN. It costs but six cents per week; every number contains from six to ten engravings of new machines and inventions which cannot be found in any other publication. It is an established rule of the publishers to insert none but *original* engravings, and those of the first class in the art, drawn and engraved by experienced artists, under their own supervision, expressly for this paper.

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FROM THE STEAM PRESS OF JOHN A. GRAY

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